The IRON AGE
September 12, 1957 A Chilton Publication The National Metalworking Weekly

How To Control Total Inventory Costs P. 83

New Hot Top Cuts Ingot Discard in Half – P. 123

Steel Market Pickup Stretches Deliveries – P. 86

Digest of the Week P. 2-3

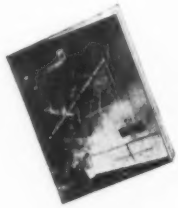
19% PRODUCTION INCREASE AND SUPERIOR FINISH

when Universal Engineering Co. switched to

LEADED 6150

In the production of this collet, Universal Engineering Co. reported it was able to increase spindle speed from 308 to 374 R.P.M. and machine speed from 108 to 125 S.F.M. Feed was stepped up from .0027 to .0047 inch per revolution. In addition to a production increase from 101 to 120 pieces per hour, finish was greatly improved and tool life was extended appreciably.

These are typical benefits obtained by users of lead treated Aristoloy Steels—benefits which you can enjoy by getting in touch with your nearest Copperweld district office.



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ARISTOLOY STEELS

XXIII

This is the twenty-third of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Annealing: Its Uses with Alloy Steels

Broadly speaking, the primary purpose of annealing is to soften steel and make it more workable. Annealing, as applied to alloy steels, may be defined as a process that heats above, and furnace-cools through, the critical range at a controlled, specified rate of speed; or that heats to a point within, and furnace-cools to a point below, the critical range. In either case, the choice depends upon the structure and maximum hardness desired.

The first method produces a lamellar pearlitic structure, while the second creates a spheroidized condition. These will be discussed separately in the following paragraphs:

(1) *Lamellar pearlitic structure.* It should be mentioned at once that this structure can be obtained both as described above and by a modified method known as isothermal annealing. In the isothermal process, the steel is heated above the critical temperature (austenitized), then transformed at a predetermined temperature, which depends upon the analysis. This operation requires two furnaces or salt baths —one for austenitizing, one for transformation.

Lamellar pearlitic structures are generally associated with machinability in carbon ranges from 0.20 to 0.60 pct, provided the hardness does not exceed the optimum maximum Brinell numeral. This is especially true where critical tooling is involved. It is a very versatile structure, as it gives best results in such operations as broaching, tapping, threading, deep drilling, boring, milling, and tooling as applied on single- and multiple-spindle bar automatic machines.

(2) *Spheroidized structure.* There are two general fields of use for this type of structure when alloy steels are employed. In the low and medium carbon ranges, spheroidization is necessary for cold-shaping operations, such as heading, extruding, drawing. In the higher carbon ranges (over 0.60 pct), it is mandatory where machining is involved, because it tends to lower the hardness of the steel.

As noted elsewhere in this discussion, both lamellar pearlitic and spheroidized structures can be created through annealing. If you care for more details about these and other uses of annealing, and the results to be expected, by all means consult with our technical staff. Bethlehem metallurgists will gladly help you work out any problems. And when you are ready for new supplies of alloy steels, Bethlehem can offer the full range of AISI standard grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through No. XX, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 20 subjects in the series are now available in a handy 36-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa.
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Indexed in the Industrial Arts Index and the Engineering Index.

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THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the Act of March 3, 1879. Price to the metal-working industries only or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single Copies 50¢. Annual Review Issue $2.00. Cable: "Ironage," N. Y.

The IRON AGE

September 12, 1957—Vol. 180, No. 11

Digest of the Week in

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ARE PROFITS PROFITS?

Call to Action—Machinery & Allied Products Institute says industry is kidding itself on profits. It urges more realistic accounting to show the real picture on corporate earnings. P. 85

STEEL ORDERS

Autumn Pickup Begins — Mills report the market is beginning to

gain, though not at the rate hoped for. Chicago leads in flat-rolled sheet demand. P. 86

SPECIAL METALS

Largest Company Formed—New firm, Mallory-Sharon Metals Corp., will be the biggest integrated producer of titanium, zirconium and other light metals. It's jointly held by P. R. Mallory & Co., Sharon Steel Corp. and National Distillers and Chemical Corp. P. 88

WHAT CONGRESS DID

Big Talk, Little Action—Indus-

Metalworking

◀

SAVE ON INVENTORIES: Tight inventory control can save you money. It can also improve customer service, avoid shutdowns due to material shortages. As an area for cost-cutting, it's worth looking into. Simple formula has helped many firms. Hotpoint Photo. P. 83

try got little help from Congress despite all the talking. But there's a ray of hope: Elections in '58 will spur Congressional activity. P. 91

LINCOLN'S NEW PLANT

Why Wixom?—One of the auto industry's newest showplaces is Lincoln's plant at Wixom, Mich. How the division went about choosing the site is a study in modern planning. But some unexpected changes have come about. If Lincoln had it to do over, would it pick Wixom again? P. 100

FEATURE ARTICLES

INGOT HOT TOP

Cuts Discard In Half—It's the latest Scandinavian contribution to steelmaking. Several American firms have been running tests for more than a year to see how it fits into our methods and economies. So far it looks mighty good. P. 123

GRINDING RESEARCH

New Theory—To improve grinding techniques and equipment, the researcher has been bringing out the need for better measurement. A combination of mathematical formulas and direct heat measurements is shedding new light on old problems. P. 127

PLASTISOL LININGS

Asset For Plating—Plastisol coatings resist a wide range of plating solutions. It means that one tank can be used for several plating processes by simply washing and rinsing the hard plastisol lining. P. 130

ETCH STAINLESS

For Low Cost Plaques—Large sheets of stainless steel can be etched quickly and easily to serve many decorative purposes. The blank plate can be offset printed. The result is a clear bold area of image. P. 132

FATIGUE MACHINE

Tests Designs and Materials — Where it's easy to test specimen materials, the testing of full-size structures can be more meaningful. The basic unit of a recently introduced fatigue machine is the loading cylinder which can be used in combinations to simulate stresses on various structures. P. 134

MARKETS & PRICES

STAINLESS STEEL

Armco Has New Grade—Development of a new stainless steel, PH 15-7 Mo, is announced by Armco. It is intended especially for aircraft and missiles. Its advantage: ability to stand heat of 1000°F. P. 89

FASTENER SALES

Swing Upward — After a poor second quarter, August ordering took a surprising turn for the better. With two major industries not yet heard from, 1957 may well show a 5 pct or higher increase in dollar volume over 1956. P. 90

INDUSTRIAL DIAMONDS

Demand Grows—Makers of industrial diamond tools are barely keeping abreast of orders. Research is finding improved uses in automated metalworking processes. To meet expected future demand, De-Beers is hunting new mines in Africa. P. 92

MACHINE TOOL ORDERS

Still Pretty Good—Almost all machine tool builders admit that business is below what had been expected. However, large and small machining facilities have taken up some of the slack. P. 109

MILL ACTIVITY

Working Up Steam—Steel mills are fanning sparks shown in the market this week. Hope is it will become a bonfire before the month is over. P. 171

NEXT WEEK

STEELMAKING

Plans for Tomorrow—It's been a year of new developments, new processes. Next week's feature points out how they fit into the immediate future of metalworking. It shows up the importance of research to steelmakers. U. S. Steel Corp. photo.

60 CYCLE INDUCTION MELTING

Melting metals in the 60 cycle induction furnace will bring greater economy and quality to your melting and casting operations. Whether you produce zinc or aluminum die castings, brass or bronze castings, ductile iron castings, or aluminum extrusions — to name but a few fields — there is an induction furnace to do your job.

60 cycle induction melting will reduce metal losses to a minimum and eliminate metal contamination. Alloy composition is maintained uniformly, and metal temperature is closely controlled at all times. Operating conditions are ideal: worker fatigue is reduced significantly.

AJAX ENGINEERING CORPORATION has specialized in just this one field: building the best and most efficient 60 cycle induction melting furnace for the job. As pioneers of this melting principle we have accumulated considerable experience in each field of application.

AJAX induction furnaces have been instrumental in establishing new metallurgical processes such as continuous casting, continuous galvanizing, and aluminum coating of steel. Exclusive AJAX developments are the electromagnetic pump and the AJAXOMATIC for controlled pouring.

AJAX 60 cycle induction melting furnaces range in size from 20 kw to 2000 kw, produce from 150 pounds per hour up to 40 tons per hour.

MAY WE HAVE YOUR INQUIRY?

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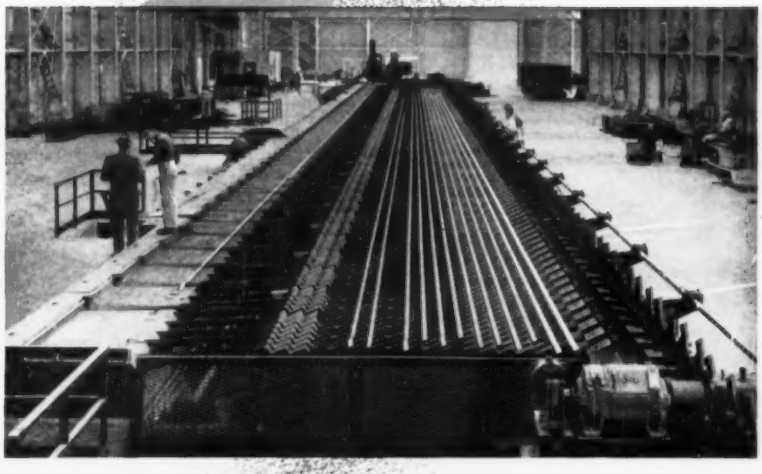
Associated Companies: Ajax Electric Company — Ajax Electrothermic Corp.

MORGAN MILLS
MORGAN QUALITY

from START to FINISH

MERCHANT AND ROD MILL
Atlantic Steel Company
Atlanta, Georgia

Morgan engineered and equipped from charging car to cooling bed this new Atlantic Steel Mill is now in full operation. This mill is just one of two hundred and twenty-one Morgan continuous rolling mills which have been purchased by steel plants throughout the world.



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RM 72

Special Armco Steel Cuts Painting Costs,

Makes Your Products Look Better Longer

Mill-Bonderized Armco Cold-Rolled PAINTGRIP® Steel helps streamline painting schedules, produces smoother, more durable paint finish.

If you use painted sheet metal in your products, you'll be interested in the cost-cutting and sales-boosting advantages offered by Armco Cold-Rolled PAINTGRIP. Both service records and exposure tests prove its superiority over ordinary cold-rolled steel for parts that must be painted. The reason is this special steel is given an electrolytic "flash" of zinc and then Bonderized at the mill. It is designed specifically to take paint and hold it longer.

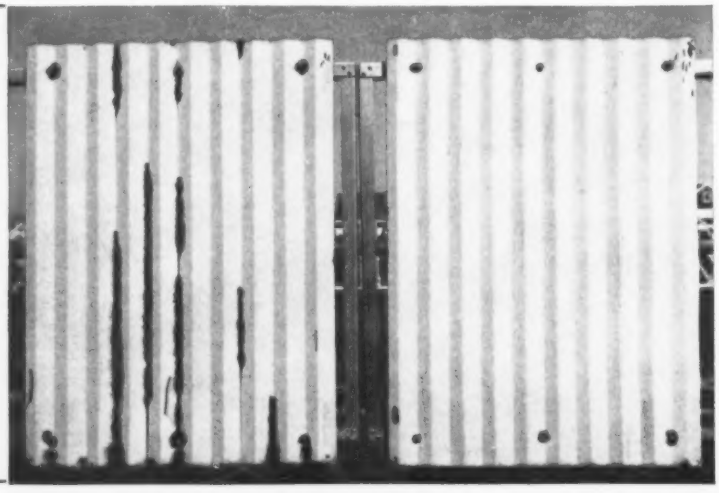
Combination of Advantages

The special paint-holding surface of Armco Cold-Rolled PAINTGRIP offers you a combination of advantages that make possible easier fabrication and improved product performance.

- **Easy to Fabricate—Can be readily formed, drawn, welded and soldered. Surface remains intact during drawing or forming.**
- **Simplifies Painting—Cold-Rolled PAINTGRIP is ready to paint. Surface treatment eliminated and paint easier to apply. On interior unexposed surfaces, mist-primer coat may be eliminated.**
- **Resists Rusting in Storage—Not recommended for use unpainted but can be stored inside as sheets, coils or semi-finished parts without rusting. Cuts cleaning costs.**
- **Longer Paint Life—Helps assure uniformly smooth paint finish that lasts several times longer than paint on untreated cold-rolled steel.**

Consider Armco Cold-Rolled PAINTGRIP for *your* products. Its many advantages may help you cut finishing costs and add new customer-appeal. This paint-preserving Armco Steel is produced in sheets and coils in 12 to 28 gage. Write us today for complete information.

Results of two years in an industrial atmosphere. Same paint schedule for both panels. Scratched to accelerate flaking. Left—Untreated Cold-rolled steel. Right—Armco Cold-Rolled PAINTGRIP.



ARMCO STEEL CORPORATION

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SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

The New Pessimism: Just How Valid Is It?

Business has many hurdles to overcome in the months and years ahead. Up to now it has done well. But there are new types of pessimism abroad in the land.

Some of the recent thinking suggests a defeatist attitude. There is no arguing with the fact that we aren't in the same vigorous upswing as we were a year ago. Some of the important gages of our economic health are flashing yellow. But is this unusual?

Many factors that tend to stop the upward movement of the business cycle were "planned that way" as anti-inflationary measures. Now that inflation seems to have been slowed down are we going to worry our heads off about deflation?

The tight-money policy will soon have less in its favor if industrial activity curves move downward too fast. The cutbacks and stretchouts in defense spending will seriously affect some manufacturers to an extent where it will hurt. But that may be temporary and will be a small price to pay—if taxes are reduced substantially.

Most of this sobering news can be taken in stride. American business has gone a long way since the panics of 1907 and 1929. Going back further than that—the country has always grown and it has always "come back." There is no reason to fear the future.

But the kind of talk we hear recently can have a serious effect upon our thinking—if we let it. We are told for instance that we are having too many babies. The cynics say that with more babies and older people there will be fewer able-bodied workers to carry the full load. That means, so they say, a lower standard of living for all. What a long cry from the "broad unlimited horizons" attitude of a few years ago?

Another choice whisper is that "there is nothing new to spark a pickup." What rot. We can't be in an upward spiral all the time. We are now consolidating in a manner that promises there won't be a future catastrophic bust. Why should we look at it as though we were ready to cave in?

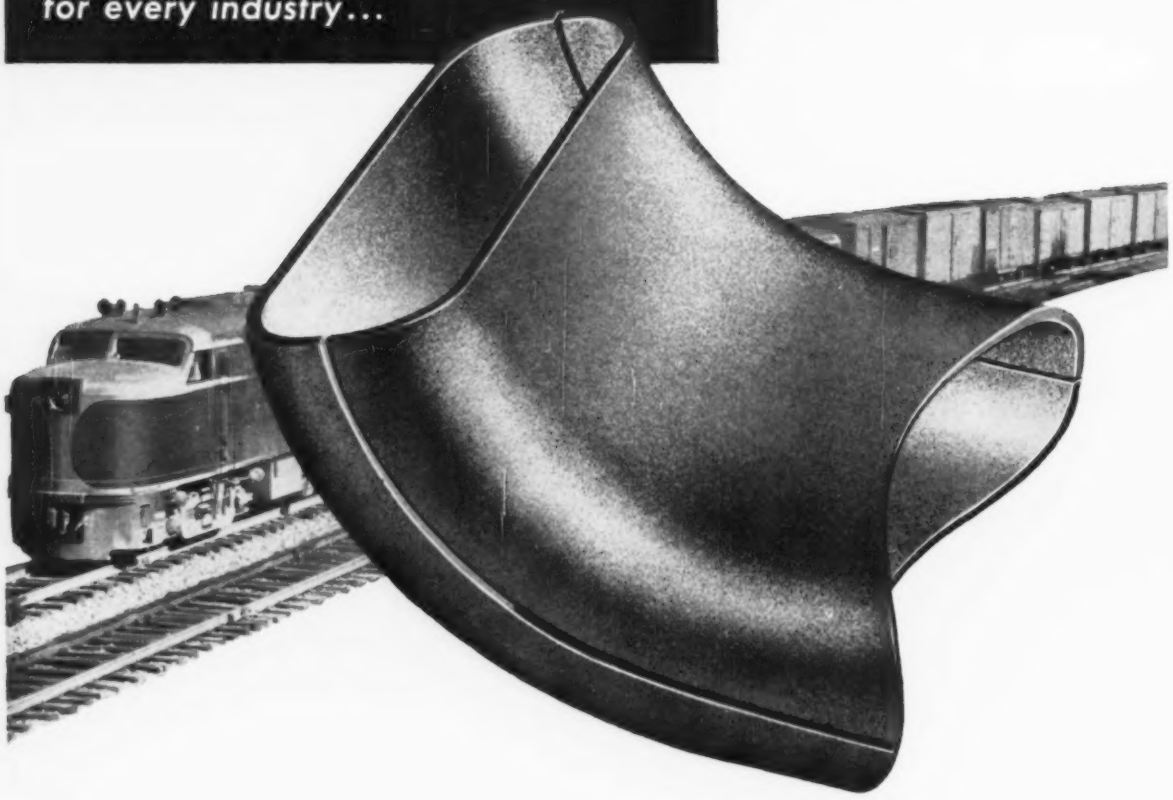
Leadership, machinery, engineering, brains and hard work will, as always, keep our economy forging ahead. But it can't operate on fear—or two-bit cautiousness. And fortunately for us it doesn't.

The "new" pessimism isn't valid!

Tom Campbell

Editor-in-Chief

COMMERCIAL *Custom Stamping*
for every industry...



Cuts material costs 50%!

By making it possible to switch from a forging made from hot rolled tubing at 15 cents a pound, to a stamping made from mild flat steel at 6 cents a pound, Commercial has been able to effect a substantial saving for a leading manufacturer of diesel locomotives.

AN EXHAUST ELBOW TUBE is the part in question. There are 32 of them on each 16-cylinder diesel engine. Commercial makes two open stamping for each elbow, which are welded together automatically. Each half—stamped from 1/4-inch flat steel—is held to rigid tolerances of +0 −1/32. The ends need no trimming either, and fit both the engine block opening and manifold to which they are welded, right on the button. Now, strong, even welds with full penetration are routine.

UNUSUAL FORMING PROBLEMS like this one—in every industry—are routine at Commercial. The skill of Commercial engineers, plus Commercial's "die-bank" of over 2300 basic die components, may be just the cost-saving solution you need for your component forming problem. You can make Commercial prove it —without cost or obligation—by simply sending along a blueprint, sketch, or even sample of the part you are now making or plan to make.

Address inquiries or requests for forming engineering assistance to The Commercial Shearing and Stamping Company, Dept. K-37, Youngstown 1, Ohio.

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LETTERS FROM READERS

Toledo's Pride

Sir—The article on Toledo in the Aug. 22 issue of THE IRON AGE was not only factual, but refreshing and encouraging to those of us who are taking on the challenge to build the port and its international trade.

You captured the "feel" of Toledo and its pride in its Port. It clearly shows that the American pioneering spirit is not a dead word. —R. Huart, Asst. Vice Pres., Mgr. International Dept., The National Bank of Toledo, Toledo, O.

Trepanning Boost

Sir—The article entitled "Trepanning: Faster Holes with Fewer Chips" in the Aug. 15 issue of THE IRON AGE is a credit to your magazine. I am speaking from experience dating from when I was with the Carboloy Dept. of General Electric and introduced trepanning early in 1950 at Bethlehem Steel.

I also spent some time with Bill Heppenstall when he developed his first trepanning lathe at Pittsburgh. I was with Mr. Charles Gordon at the Midvale-Heppenstall Co. plant last Friday and we discussed various phases of trepanning. They are to be complimented for developing a large rugged trepanning lathe which will reduce the time for producing holes through large rotors by a ratio of about ten hours to one hour. On other machines where the work diameter is smaller and higher spindle speeds can be used, the relative savings are even greater.

Higher Savings—With one customer alone we have engineered and made heads for trepanning a series of five holes sizes (9¾ in., 10⅜ in., 11 in., 12½ in., 14 in. diameter) with a 15½ in. and a 17 in. size now in process. This also covers the necessary drive tubes. The savings in this case range in still higher figures than mentioned above.

Your article is timely and will do much to promote the production of holes by the trepanning process. Would you please send me six reprints of your article to assist us with further promotional work? —F. W. Lucht, Engr., Ruscot Tool & Engineering Co., Ferndale, Mich.

▪ Copies are on the way.—Ed.

Lemon Aid?

Sir—It would seem to me that your Aug. 15 article "Is New Car Quality Slipping?" does an excellent job of pointing out all the reasons why quality has slipped. But it sheds little light as to what corrective measures will be forthcoming.

Naturally, all of us are interested in what the factories and dealers are going to do about this sad state of affairs. And your statement," chances of getting a real lemon are practically nil"—well, your definition of a $4000 lemon and ours are apparently two different things.

We have known several cases of either engines or transmissions or axles requiring replacement in "the very early miles." In our book these are lemons—and it did happen here! So—show me!—D. Zuerl, Secretary, Danuser Machine Co., Fulton, Mo.

"Funston, take this new man out and show him the ropes."

DI-ACRO*NOTCHER
Speeds Production, Saves Extra Operations on Chassis Work

"I use our Di-Acro Notcher for practically everything," says V. Johnson of Maico Co., Inc., Minneapolis manufacturer of hearing testing equipment. "This machine speeds production—*provides one operation notching* of cold rolled steel, brass, phosphorous bronze and aluminum up to 16 gauge thick. It's also used for notching fish paper, sponge rubber, 1/16" linen Bakelite and other circuit insulating materials that go into chassis for audio testing equipment."

The 4 ton pressure of this machine has the capacity to cut a 90° notch as large as 6"x6" in 16 gauge steel *in one operation.* Adjustable gauges mounted on work table are standard. Hardened and ground triangular ram assures years of precision. A clean cut, free from rough edges and burrs, is possible because blade clearance can be easily set. For high speed production, a power model is available.

Di-Acro Notcher is used on the open end of this .064" aluminum chassis at Maico Co., Inc.

Consult the Yellow Pages of your phone book for the name of your nearest Di-Acro distributor or write us for catalog describing this and other Di-Acro machines

*pronounced die-ack-ro

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G.T.M.-Specified
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A
B
C
A Tough wear- and weather-resistant cover
B Reinforcement of sturdy wrapped fabric plus helix of flat steel wire prevents kinking and collapsing
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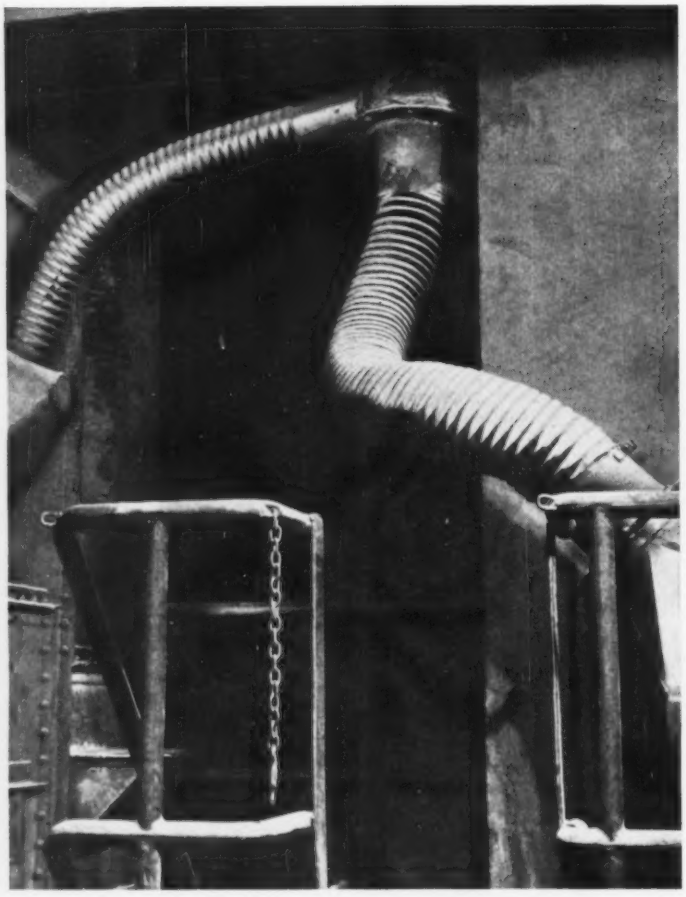


Hose at one-third the cost outlasts pipe—4 to 1

Carrying off large quantities of abrasive dust had always been an expensive problem at this Northwestern plant. For it quickly ate through heavy-gauge pipe—especially where the ducts had to make sharp turns. In fact, 8 to 10 months was the limit for any pipe they tried.

But the G.T.M.—Goodyear Technical Man—figured he could top that with HD Industrial Vacuum Hose. It not only cost much less than the special pipe, but could be installed far more quickly and easily. And when worn, it could be rotated to distribute wear. But here's the real pay-off: at last report, *the G.T.M.'s hose was still going strong after 3 years' service.*

What about production-line problems swelling *your* costs – and eating *your* profits? You can't lose by turning the G.T.M. loose on them – whenever they involve industrial rubber problems. You can reach him through your Goodyear Distributor – or by writing:

Goodyear, Industrial Products Division,
Akron 16, Ohio

HD INDUSTRIAL VACUUM HOSE by

GOODYEAR

THE GREATEST NAME IN RUBBER

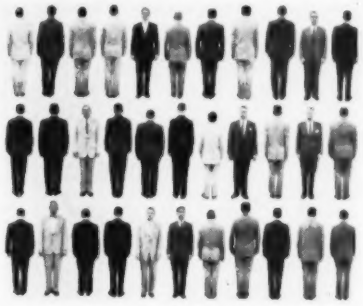
IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

Take Your Pick

One of our June covers, "How to Pick Executives" (see cut) drew an anonymous female protest. "There is not one word about women executives in your report," she wrote. "It would not hurt to have three women among all those men."

This touched us to the quick because apparently our male readers liked the story. At least, we've had more than 300 separate letters asking for reprints. Still have a few left if you missed it.

So we've arranged to show you right here and now, though on a smaller scale, what that June 27 cover would have looked like had we used no men—just girls. What do you think?



The original cover.

All-girl cover.

Readers Help

You may recall the letter we published a few months ago from a Philippine student asking for help in his efforts to study metallurgy in this country.

Well it looks like things are going pretty well for him now. The first we learned was that A. Jay Hofmann Machinery Co. had offered him a distributorship in the Philippines to help pay his way through a U. S. engineering school.

Here is the latest word we received from him in a recent letter:

"I should like to express my sincere gratitude for your wholehearted effort in helping me. Your fine editorial with emphasis on foreign aid among other world problems, plus the caption and suggestion at the end of my well-condensed letter, was indeed graceful. I couldn't ask for more.

"As a result, the Directors of the Renssalaer Polytechnic Institute of Troy, N. Y., have also taken a serious interest in my case, besides Messrs. A. Jay Hofmann Co.

"There is a possibility of a scholarship grant, if and when I can meet the other expenses and fees not covered.

"Such a response from the American people is indeed gratifying."

Respectfully yours,
Antonio G. Fernandez,
San Juan, Rizal, Philippines

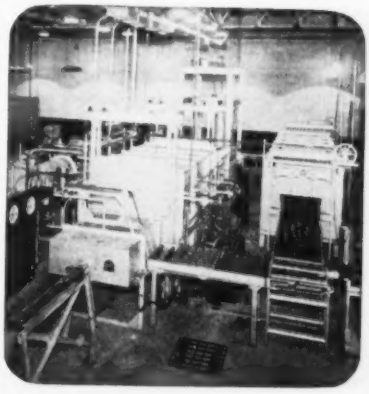
Puzzlers

Mr. McCleod was absolutely right to fire the night watchman because he had told the vice-president that he had had a dream the night before and night watchmen are supposed to be awake at night!

Happy to say we had quite a few winners on the July 25th puzzler and here they are:

Walter A. Johnson, Chicago, Ill., Norma J. Schweig, City of University City, Missouri, M. R. Scopelite, State Metals and Steel Company, Inc., Canton, Ohio, Miss S. Levine, American Nickel Alloy Mfg. Corp., New York, N. Y., Milt S. Wright, McQuay-Norris Mfg. Co., Indianapolis, Ind., F. A. Bellamy, Purchasing Agent, Henrite Products Corp., Ironton, Ohio.

LABOR SAVED 50%
PRODUCTION UP 50%



R-S . . .
CONTINUOUS HARDENING, QUENCHING, DEGREASING, DRAWING LINE

It's one operation instead of four to heat treat cylinder liners at Continental Motors with the R-S equipment. Electric heat treating line is one complete unit ...temperature is 1575° F. for hardening, it is oil quenched and the draw furnace operates at 1100° F. The atmosphere is controlled through hardening and quenching operations and capacity is 1,300 gross lbs. per hour.

R-S Heat Treating unit requires only two men instead of four with the conventional type. Production rate is up 50% . . . quality is uniformly high . . . and the unit paid for itself in 22 months.

Why not put these savings into your heat treating? Write today for your copy of the booklet on better heat treating. Ask for R-S 200. No obligation.

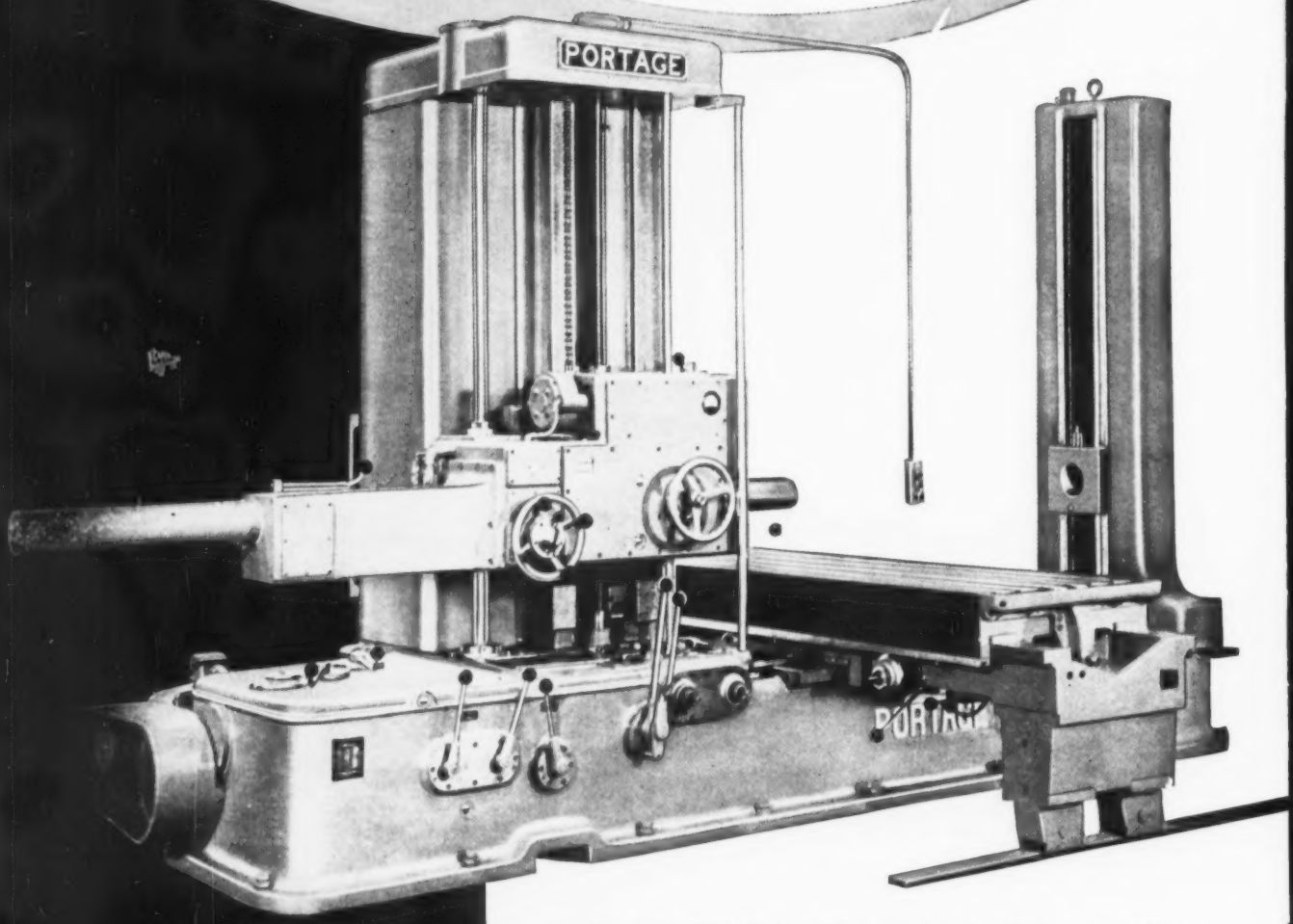
R-S FURNACE CO., INC.
Philadelphia 44, Pa.

Car Hearth Furnaces
Continuous Furnaces
Rotary Type Furnaces

R-S FURNACES

PORTAGE *Announces...the*

NEW LOOK



The new PORTAGE No. 4 Horizontal Boring, Drilling and Milling Machine has a complete NEW LOOK. A heavier base, column, saddle and head are a few of the new features. The overall "beefed up" machine offers a wider range of versatility. NOW. . . you can handle the larger work . . . with the smallest possible capital investment. Write for complete information.

THE *Portage* MACHINE CO.

1035 Sweitzer Avenue • Akron 11, Ohio

Representatives in Principal Cities

BUILDERS OF PRECISION MACHINE TOOLS SPECIAL AND PRODUCTION MACHINERY SINCE 1916

EXHIBITS, MEETINGS

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22.)

AtomFair '57—Oct. 28-31, New York. (Atomic Industrial Forum, 3 E. 54th St., N. Y. 22.)

Metal Show—Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

SEPTEMBER

American Die Casting Institute—Annual meeting, Sept. 17-20, Edgewater Beach Hotel, Chicago. Society headquarters, 366 Madison Ave., New York 17.

National Industrial Conference Board — Marketing meeting, Sept. 18-20, Waldorf-Astoria Hotel, New York. Society headquarters, 460 Park Ave., New York 22.

Marking Device Assn. — National meeting, Sept. 19-20, Roosevelt Hotel, New Orleans. Society headquarters, 912 Chicago Ave., Evanston, Ill.

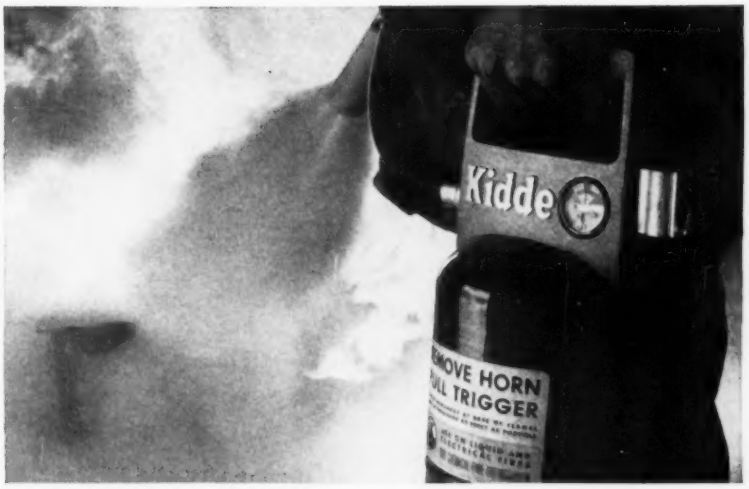
Malleable Founders' Society—Fall meeting, Sept. 20, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland 14.

Steel Founder's Society of America—Fall meeting, Sept. 23-24, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

American Machine Tool Distributor's Assn. — Annual meeting on serving tomorrow's markets, Sept. 23-24, Hotel Cleveland, Cleveland. Society headquarters, 1900 Arch St., Philadelphia.

The American Society of Mechanical Engineers—Fall meeting, Sept. 23-25, Statler Hotel, Hartford,

(Continued on P. 16)



Easiest, fastest way to kill fire...

KIDDE NEW DRY CHEMICAL EXTINGUISHER

Here – from Kidde – is the newest, the fastest, the easiest-to-operate dry chemical fire extinguisher!

Look at the extra large, aluminum handle and trigger – even a gloved hand fits comfortably with room to spare. Pick the unit up – it hangs straight – no awkward angle to throw you off balance.

If fire strikes, follow the simple directions: "Remove Horn" – automatically the trigger safety lock is released – "Pull Trigger" – instantly a cloud of fire-killing dry chemical whooshes out of the nozzle and fire's out! With this unit, designed by Kidde engineers working with Henry Dreyfuss personnel, you don't have to be a trained fireman to get perfect results.

Built for a lifetime of use, the handsome, new 20 and 30 pound Kidde dry chemical extinguishers have top ratings from Underwriters' Laboratories, require only 225-250 psi charging pressure. The rugged pressure gauge is recessed in handle for maximum protection. Tells at a glance if the unit is ready for use.

Available nationally through Kidde's sales and service organization. Write Kidde today for the name of nearest distributor.

Kidde

Walter Kidde & Company, Inc.
949 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

An Entirely New Concept

15,000 LB. MODEL

Greatest stability at every stage of 120 inch lift

Dotted line above shows how Automatic Elbolift's built-in retraction feature maintains maximum stability every inch of its 120" lift. Tilting action illustrated is operated by a single control lever which can tilt and/or lift load separately or simultaneously.

AUTOMATIC TRANSPORTATION COMPANY

Division of The Yale & Towne Manufacturing Company

101 West 87th Street, Chicago 20, Illinois

in Fork Lift Truck Design...

Automatic ELBOLIFT!

12,000 TO 20,000 LBS. CAPACITIES

Eliminates Mast Assembly...Weighs 6000 lbs. less than any comparable mast-type truck...is definitely superior in stability, maneuverability, and operator vision.

370% More Visibility: Picture at left dramatically illustrates the increased visibility over conventional, mast-type, heavy duty trucks. Forks completely visible when entering pallet.

Drive tires two-thirds of Elbolift's width: 32 lineal inches of the truck's 48" overall width are in contact with the floor for the greatest load distribution and stability.

All conventional ideas of fork lift trucks were scrapped in designing this newest in the long, distinguished line of Automatic "firsts." Only in this way could Automatic engineers achieve the marked improvement in capacity, maneuverability, safety, performance and weight reduction which they had set as their goal.

The result is a truck with capacities from 12,000 to 20,000 lbs. —15,000 lb. model 48" wide, and 105¾" long (less forks) is actually *three tons lighter than any comparable mast-type truck.* This permits the Elbolift to operate on floors that would be unsafe for other types of comparable capacity.

Its unique design is also responsible for other advantages ...among them the following:

Exclusive New Power Steering Control—takes the guess work out of steering. *Operator always knows* the exact direction of his steer wheels by the position of the steering lever.

Shortest Inside Turning Radius—does more work, handles heavier loads in less space. Operates easily in 13'8" right angle aisle and 78" boxcar door with 52" square load.

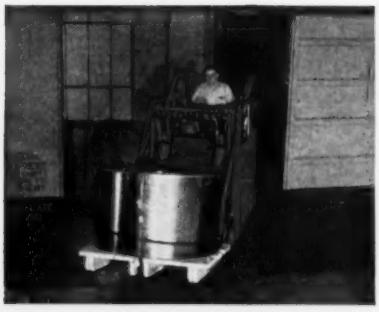
Highest Lift With Lowest Overall Height—Elbolift has 80" overall height with a 120" lift.

Safety—Easy on—easy off. Operator completely protected by counterweight on both sides and heel plate in the rear. Dead man control...returns speed controller to neutral and automatically applies brake when driver dismounts.

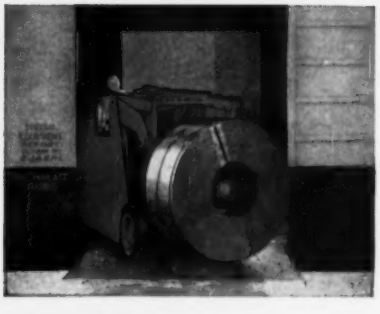
Exclusive New Inching Control—4 speeds forward and reverse with foot inching to any preset or selected speed.

Battery Accessibility—battery on rollers for quick and easy removal from either side.

But there's ever so much more than can be adequately described here. Why not get the whole story? No obligation. Just mail the coupon below...mail it today.



Maneuverability: Carrying a full load of 15,000 lbs. (52" square), the Elbolift passes easily through any 78" boxcar door...will right angle stack a 52" load comfortably in a 13'8" aisle.



Versatility: Ram attachment at left can be quickly and easily replaced by adjustable forks for handling dies, pallets, etc.

AUTOMATIC TRANSPORTATION COMPANY
75 West 87th Street, Dept. P-7, Chicago 20, Illinois

Rush me fully illustrated descriptive brochure on the revolutionary new Automatic Elbolift Trucks.

Your Name_____ Title_____

Firm Name_____

Address_____

City & Zone_____ State_____

Super Metals
by **WALLINGFORD**

As man and machines fly higher and faster, beating the heat problem becomes more difficult . . . the need for super metals more acute. This is why WALLINGFORD has long engaged in research with super alloys that will successfully pass the rigorous test of high temperature applications.

Among the many super alloys researched by WALLINGFORD are Alloy A-286 and V-36 used for applications in jet engines, gas turbines and turbosuperchargers — turbine wheels and blades, frames, housings and afterburner and tail cone parts.

An unceasing program of metallurgical research and highly skilled personnel qualify WALLINGFORD to help you, whether your need is super metals, or quality stainless steel strip, tube or pipe.

Let us know your high temperature problems . . . we'll help you solve them.

THE WALLINGFORD STEEL CO.
WALLINGFORD, CONN., U.S.A.

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless*

EXHIBITS, MEETINGS

(Continued from P. 13)

Conn. Society headquarters, 29 W. 39th St., New York.

Standards Engineers Society—Sixth annual meeting on standardization — economy through application, Sept. 23-25, Hotel Commodore, New York. Society headquarters, P. O. Box 281, Camden, N. J.

Assn. of Iron & Steel Engineers—Annual Convention, Sept. 23-26, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1010 Empire Bldg., Pittsburgh.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 26-27, Netherland-Hilton Hotel, Cincinnati. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

National Screw Machine Products Assn.—Fall membership meeting, Sept. 29-Oct. 3, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 2860 E. 130th St., Cleveland 20.

OCTOBER

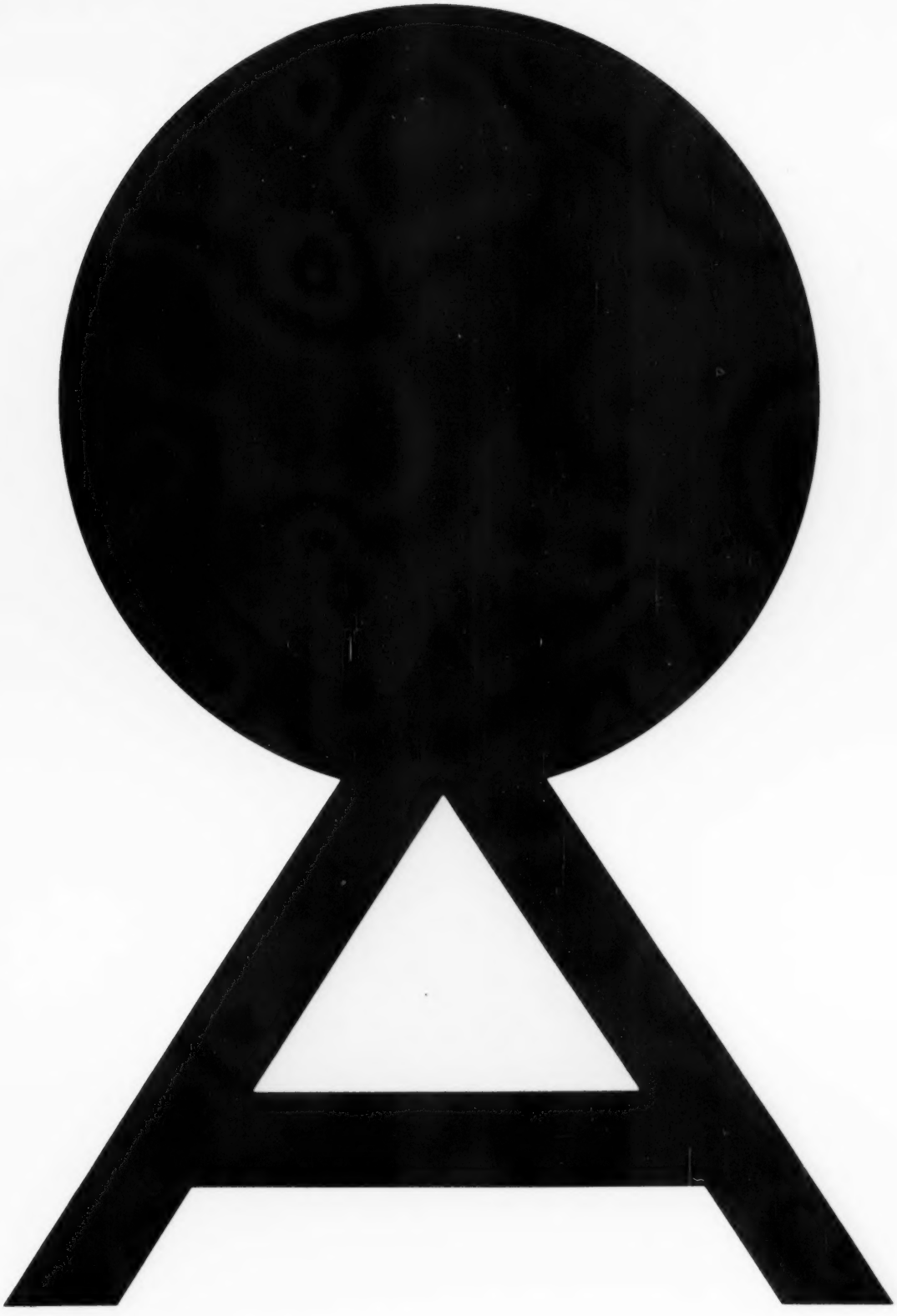
The Electrochemical Society — Semi-annual meeting, Oct. 6-10, Statler Hotel, Buffalo. Society headquarters, 216 W. 102nd St., New York.

American Institute of Steel Construction — 35th annual meeting, Oct. 6-11, Hotel del Coronado, Calif. Society headquarters, 101 Park Ave., New York.

American Society of Lubrication Engineers—Fourth conference, Oct. 7-9, Royal York Hotel, Toronto, Ont., Canada. Society headquarters, 84 E. Randolph St., Chicago.

Committee on Vacuum Techniques — Fourth annual symposium on high vacuum technology, Oct. 9-11, Hotel Somerset, Boston. Society headquarters, Box 1282, Boston.

Gray Iron Founders' Society, Inc. —Annual meeting, Oct. 9-11, The Drake Hotel, Chicago. Society headquarters, 930 National City-E 6th Bldg., Cleveland.



Symbol of Olin Aluminum—and of a new concept of service standards in the Aluminum Industry . . .

Olin Mathieson
Chemical Corporation
one of the world's largest
suppliers of Chemicals, Metals and
Packaging Products, announces

an important new source of Aluminum

A MAJOR NEW OLIN MATHIESON DIVISION — WITH A DYNAMIC NEW CONCEPT OF QUALITY AND SERVICE

Important news for users of Aluminum and other metals is the full-scale entrance of Olin Mathieson Chemical Corporation into the primary Aluminum field.

Right now, limited quantities of Olin Aluminum are being produced at four locations, and soon an initial annual capacity of 340 million pounds will be a reality.

Benefiting from Olin Mathieson's already extensive experience in the metals field, Olin Aluminum will become a major source of unusually fine-quality Aluminum. And as a result of its full integration — from Bauxite to rolling mill — Olin Aluminum will be in a position to assure its customers a *dependability* of delivery that will be of vital importance.

A New Concept of Service Standards

Of equal significance is Olin Aluminum's new concept of service standards. Its new plant facilities will be the finest, most modern in existence — thus assuring the ultimate in production quality and economy. Its technical staff is composed of men of broad and extensive experience — ready to work side by side with your own engineers toward the one best solution to any of your Aluminum problems. And Olin Aluminum's new sales team consists of men with a minimum of five years of thorough experience in the Aluminum field.

The combination of these three things — new plant, experienced technicians and imaginative service per-

OLIN ALUMINUM

sonnel—will result in Aluminum of competitively superior metallurgical quality, tolerances and finishes.

A $300 Million Investment

Behind the birth of Olin Aluminum lies an exciting industrial drama. Recognizing the growing world need for Aluminum, Olin Mathieson—already greatly experienced in the production of non-ferrous metals through its Western Brass Mills Division—joined with Revere Copper and Brass to organize the Ormet Corporation. The purpose of Ormet is the construction and operation of the complete production facilities necessary to assure the supply of primary Aluminum for both companies. The Ormet Shipping Corporation was formed to import the huge quantities of Bauxite needed, and keels were laid for its three giant new 16,000-ton ore ships of revolutionary design.

Simultaneously, at Burnside, Louisiana—an ideal deep-water port—construction was begun on a large new Alumina plant. And on the Ohio River, near Clarington, Ohio, work was begun on the first reduction plant ever to have its own integrated coal supply and power-generating facilities. These new plants, fruits of a $300 million investment, form the assured source of supply for Olin Aluminum.

Better Tolerances, Finishes and Alloys

Two-thirds of the output of this fully integrated primary Aluminum production system will go directly to the new Olin Aluminum Rolling Mill at nearby Omal, Ohio, and to other Olin Aluminum facilities in the Midwest, on the West Coast and on the Gulf Coast. From these modern plants will flow custom-made Aluminum better adapted to your individual needs than any you have ever before been able to obtain. That is the goal of Olin Aluminum: a new concept of quality and service in the Aluminum Industry.

Turn the page for more news about Ω ⟶

The men from Olin Aluminum
will soon be calling on you to tell
you more about our services
and to explain how custom-made
Olin Aluminum can help you
cut your present manufacturing
costs. Meanwhile, as you plan
your immediate Aluminum needs,
we cordially invite all inquiries.
Write to Aluminum Division—Sales,
Olin Mathieson Chemical Corporation,
460 Park Ave., New York 22, N. Y.

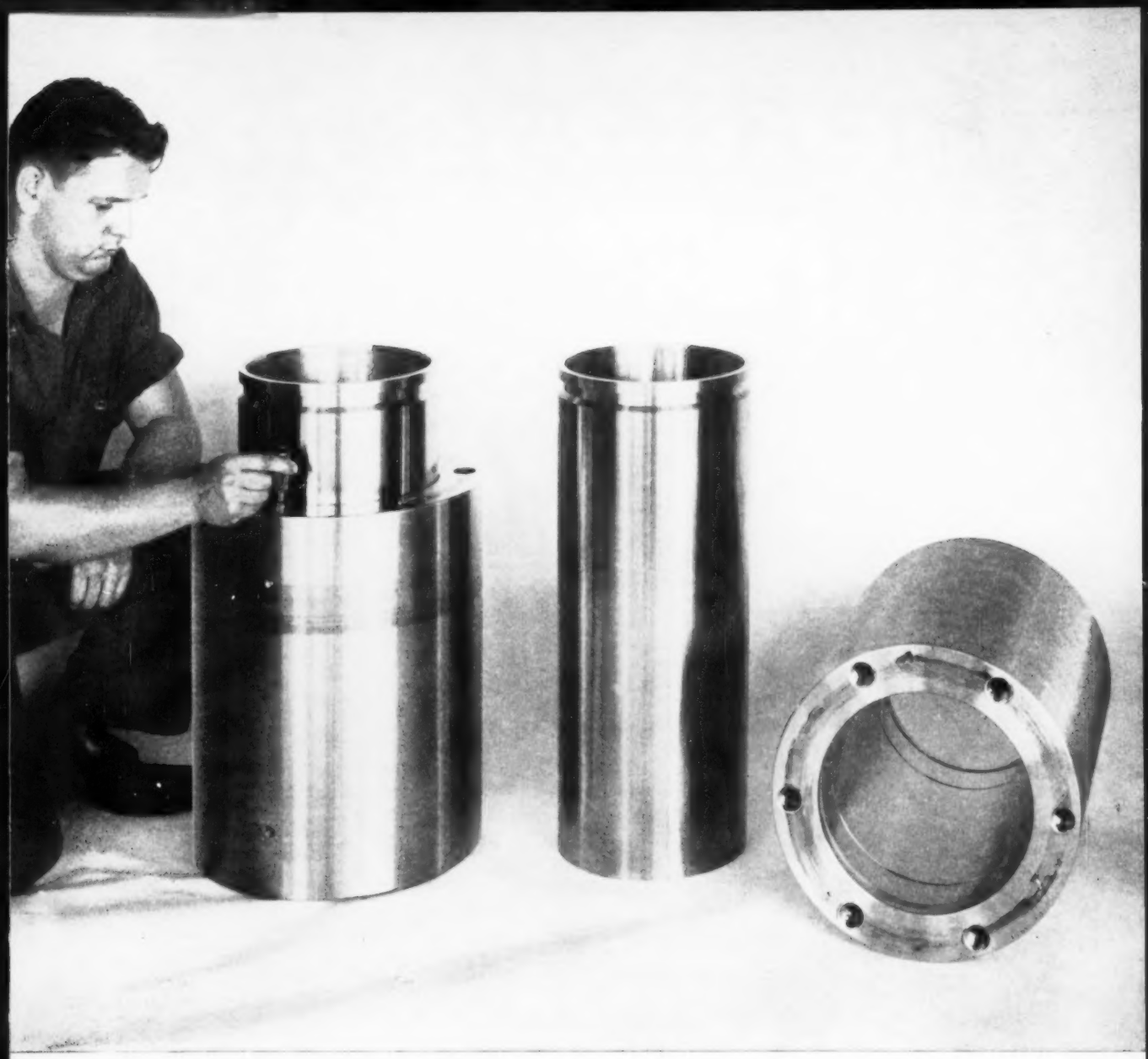
OLIN
ALUMINUM

ALUMINUM DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

Producers of many fine products
under such brand names as
WINCHESTER • OLIN • SQUIBB
MATHIESON • WESTERN

Watch for Further News About the
Big New Name in Aluminum

® AND OLIN ALUMINUM ARE TRADEMARKS



WHO FORGES THE TOUGH ONES? *& machines them, too*

Suppose you had to have a coupling, such as the one above for a ship shaft, machined so accurately that the two parts fit to each other with 90% surface contact. Where would you go to have the forging and machining done? You know, there aren't many companies that can make forgings that big, and there aren't many that can do such precision-finish machining. But we are a company that does both!

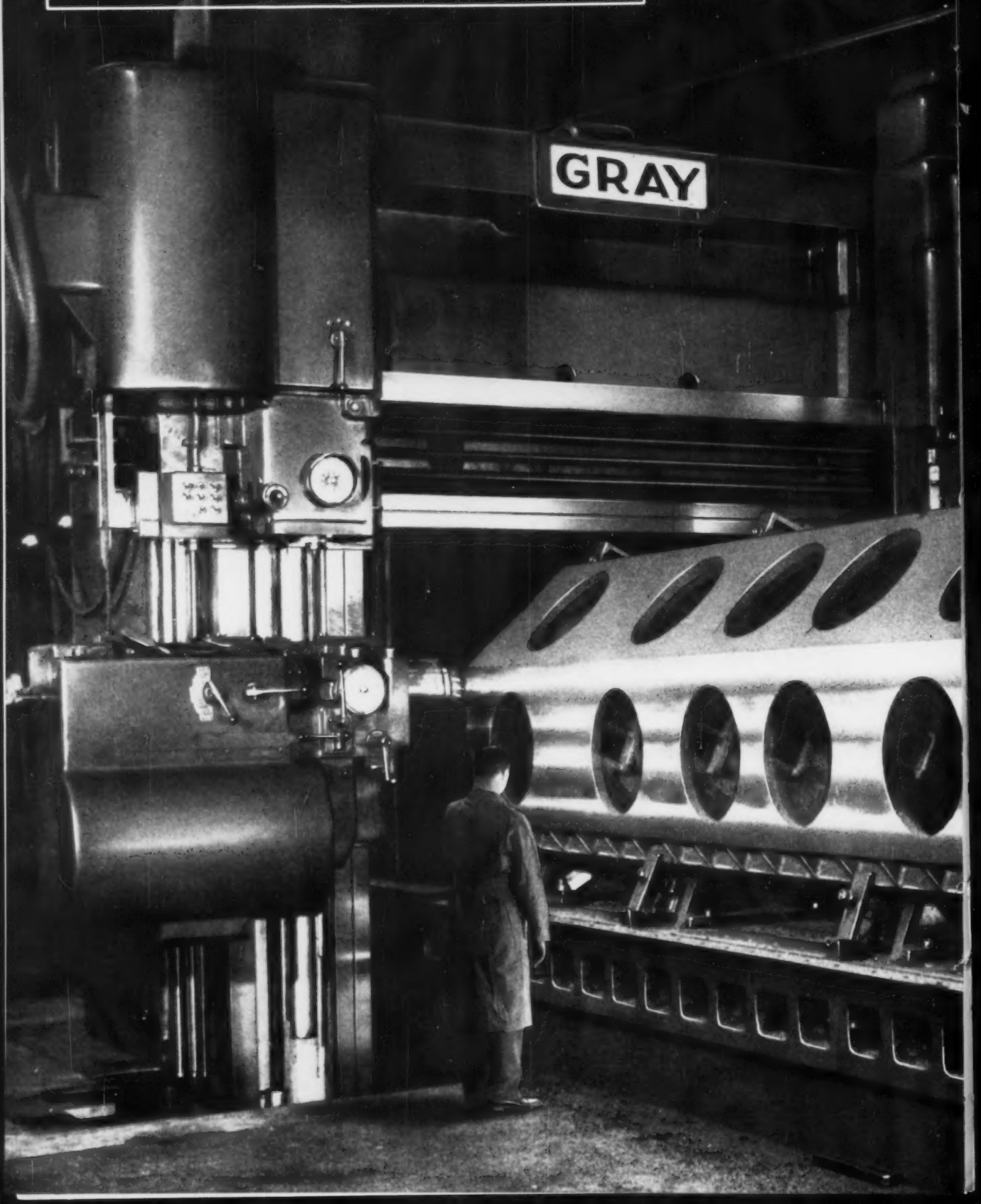
A job such as this is not a "special" with us, for we've been producing big forgings for over 40 years. And the thing our customers like best about us is that we can handle the whole job—from basic steel to finished product—all in one completely integrated plant. We'd welcome the chance to quote on your next job for big machined forgings—and to demonstrate the answer to "who forges and machines the tough ones . . . best?"

NATIONAL FORGE
AND ORDNANCE COMPANY

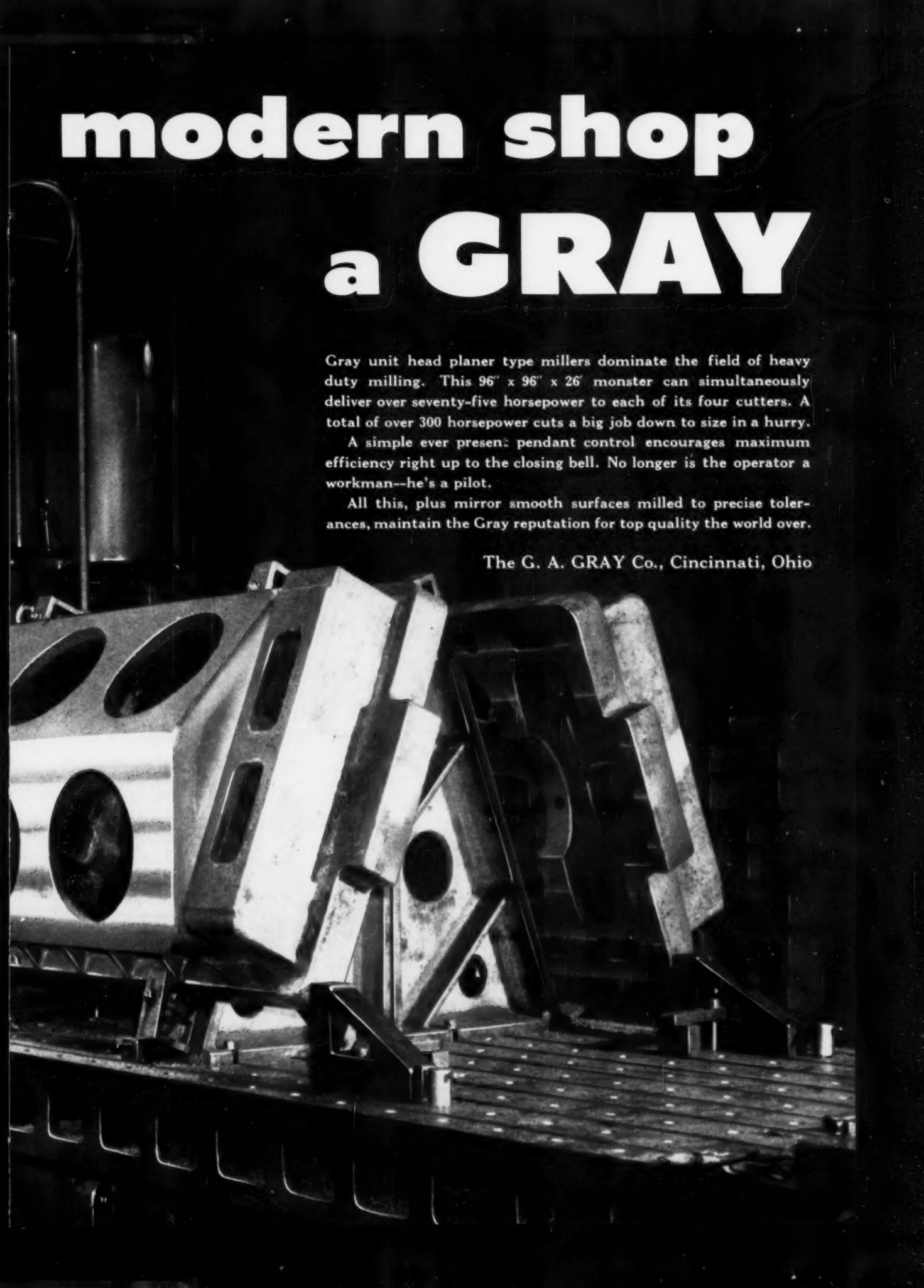
IRVINE (WARREN COUNTY), PENNSYLVANIA

To see more of "the tough ones," and the machinery they're made on, write for Bulletin NFO-1.

backbone of a



modern shop a GRAY



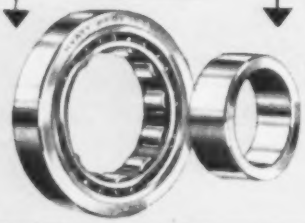
Gray unit head planer type millers dominate the field of heavy duty milling. This 96" x 96" x 26' monster can simultaneously deliver over seventy-five horsepower to each of its four cutters. A total of over 300 horsepower cuts a big job down to size in a hurry.

A simple ever present pendant control encourages maximum efficiency right up to the closing bell. No longer is the operator a workman--he's a pilot.

All this, plus mirror smooth surfaces milled to precise tolerances, maintain the Gray reputation for top quality the world over.

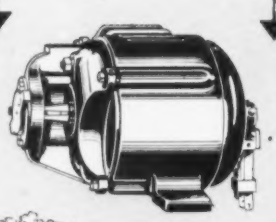
The G. A. GRAY Co., Cincinnati, Ohio

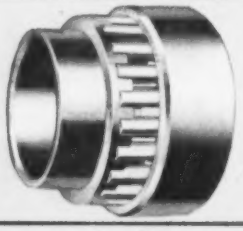
There's a HYATT HY-ROLL for every load...



HY-LOAD Series

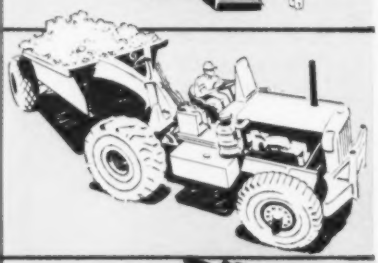
Designed for a wide variety of radial loads, and light or intermittent thrust loads, these high-capacity bearings are made in four diameter series and fourteen major types.

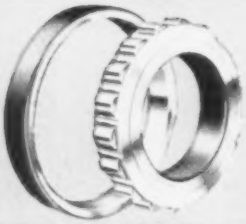




INDUSTRIAL INCH Series

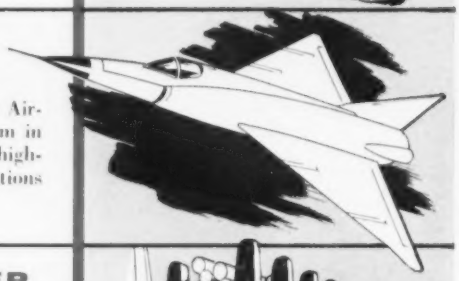
For heavily-loaded, slow-moving machinery, the Industrial Inch Series was designed to accommodate large diameter shafting where fractional dimensions are required.

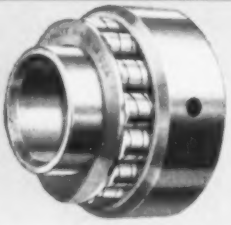




AIRCRAFT Series

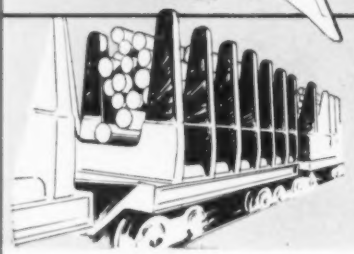
Available in over 100 sizes, the Aircraft Series attains the optimum in life-load combinations for ultra high-speed, high-temperature applications and maximum dependability.





WOUND ROLLER Series

Specifically developed for maximum resistance to shock, abrasion and fatigue, these three-part, separable bearings can be used without the inner race when desirable.



If you would like the technical assistance of an experienced sales engineer, phone or write Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Chicago; Detroit; Oakland, California.

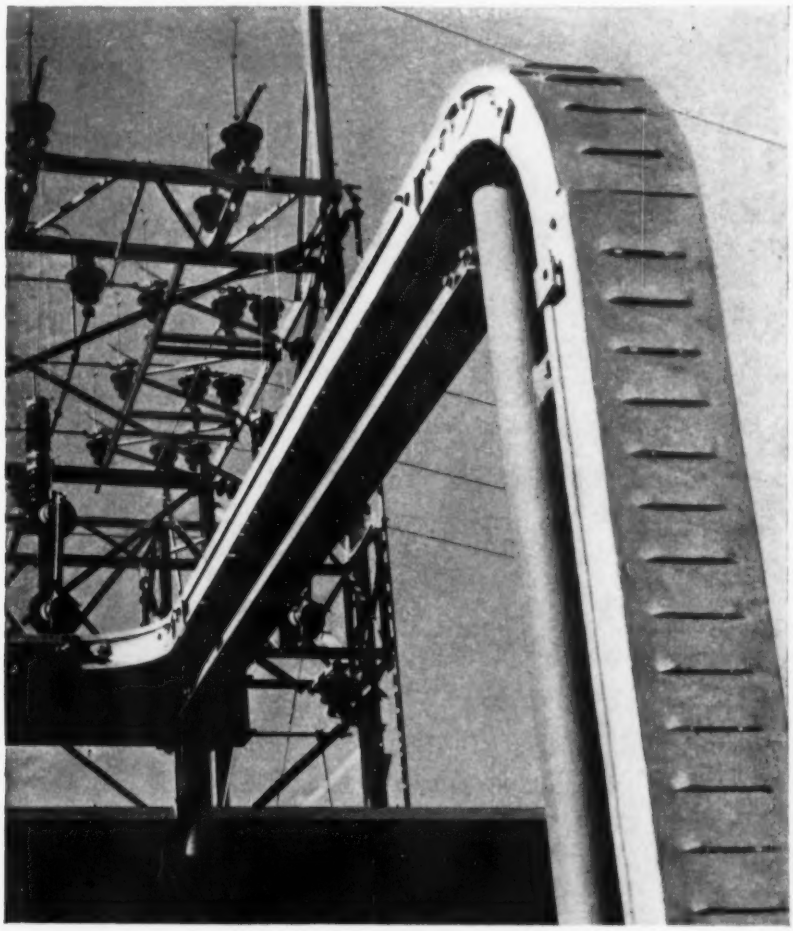
FOR REPLACEMENT BEARINGS, SEE YOUR HYATT INDUSTRIAL BEARINGS DISTRIBUTOR

GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

GREAT PRODUCTS MADE GREATER WITH **"hi-Spec"** GALVANIZING

A SALUTE TO GLOBE CABLE-WAY



PHELPS DODGE COPPER MINE — "GLOBETRAY" INSTALLATION

The safe distribution of large quantities of electric power *through or between* plants or operations is essential to large scale production and profitable manufacturing. You can't take chances – too much depends on the steady, uninterrupted flow of power from one point to another. A stoppage can be critical, fatal, disastrous.

That is why **THE GLOBE COMPANY** *"hi-Spec" galvanizes its CABLEWAY.* (GLOBETRAY and CABLESTRUT)

Cableway, both indoors and outdoors, is usually subject to factors that cause corrosion . . . sweating, seepage, fumes, chemicals, water. But "hi-Spec" galvanizing eliminates product failure due to rust or corrosion by providing more zinc coating per square foot than is called for in ASTM, Federal or Mill specifications.

GLOBE CABLEWAY with its "hi-Spec" galvanizing means longer life, lower maintenance cost and minimum chance of installation damage. We, the Metal Coating Corporation, salute **THE GLOBE COMPANY** for providing this extra protection in its CABLEWAY.

MAKE YOUR PRODUCT GREATER
WITH **"hi-Spec"** GALVANIZING
EXCLUSIVE PROCESS OF
AMERICA'S FOREMOST QUALITY GALVANIZER

Metal Coating Corporation
1215 West 37th Street, Chicago, Illinois

SPECIAL SERVICE ON REPLACEMENT ORDERS

When down-time runs into dollars with every minute, *special service* on replacement orders means substantial savings to Damascus customers.

This special service is possible because, as a supplier of tubing for original equipment, Damascus can frequently fill orders immediately from mill inventories. Where pipe or tubing required is not on hand, a large inventory of stainless strip usually permits Damascus to complete your order within days. Damascus doesn't have to wait for delivery from the strip mill.

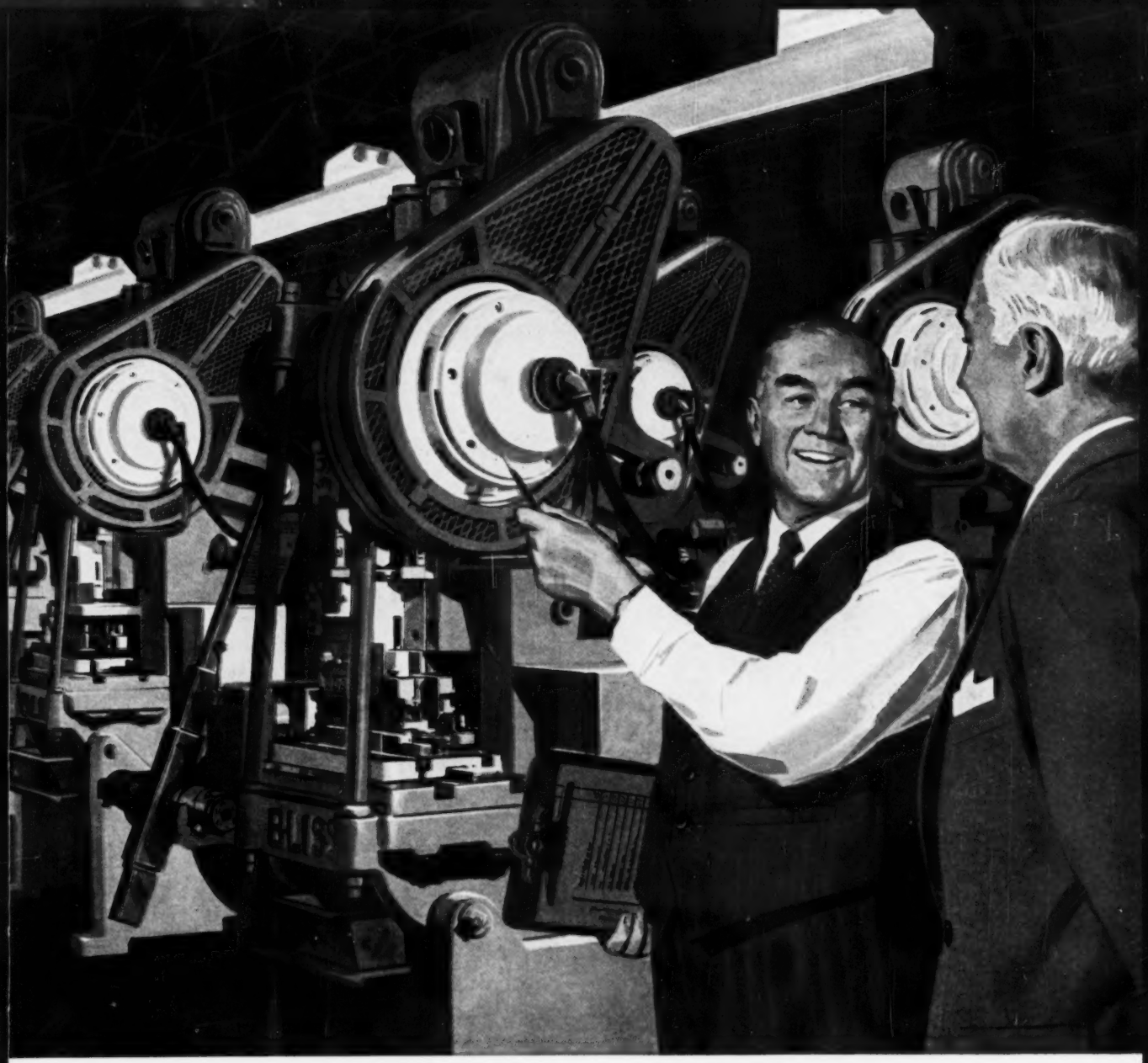
When you need tubing in a hurry, call Damascus. We can quote delivery and prices over the phone.

Write for free booklet.

DAMASCUS TUBE COMPANY

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA



"These 'super-speed' inclinables give me twice the production . . . at about half the cost!"

From their special vibration-absorbing legs to their counterbalanced shafts, these presses are built for speed.

With such special features as bronze gibs . . . automatic lube systems . . . special clutches, brakes and flywheels, and equipped with precision feeds, they can knock out short stroke work at better than 500 strokes a minute! They're all new, all Bliss, and the cost is low—surprisingly so.

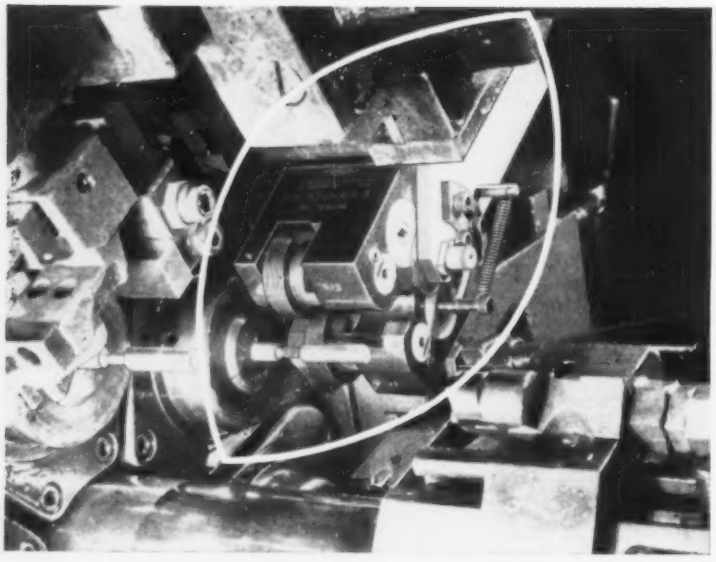
These are the latest members of Bliss' line—the line that offers industry its most complete choice of types and sizes. And with no axe to grind for any one type, you can be sure of impartial pressroom counsel—by Bliss.

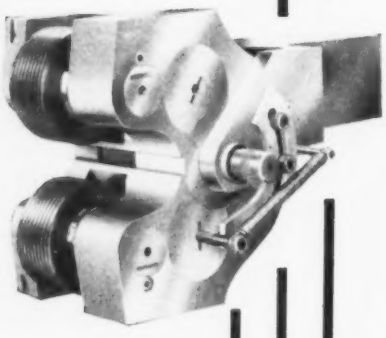
BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • ROLLS • DIE SETS • CAN MACHINERY • CONTRACT MFG.





Over 1,100,000 threads with 1 set of Rolls

The economy of LANDIS Thread Rolling Attachments due to long roll life is being demonstrated in the production of studs at the M & S Morenci Corporation in Morenci, Michigan.

#10-32 pitch NF threads, .350" long, are rolled on 1020 screw stock using a #14 GA LANROLL Attachment on a 9/16" Acme-Gridley Automatic. The Attachment is operated in the 4th position, rolling next to the collet .030" back of the shoulder, and threads are held to ±.00025" of the pitch diameter. 1,100,000 threads have been produced to date with the original set of roll dies. Another Lanroll Attachment later placed in operation on the same job has to date produced 500,000 threads with its original rolls.

This long roll life is a result of the basic design of the Lanroll Attachment incorporating patented new principles. A degree of stabilization never before obtained in a tool of this type is ensured between the workpiece and the attachment. Open construction allows the use of thread rolls of the maximum diameter, distributing wear over an increased area. The accuracy and wear-resistance of the rolls themselves is the result of more than 50 years experience in the manufacture of threading tools. These rolls are precision-ground to produce uniform, accurate threads of the highest quality.

LANROLL Attachments are made in five sizes for use on bar automatics and turret lathes to roll both fine and coarse pitch threads to Class 4 tolerances. Quick and easy set-up changes assure operation of the attachment for every size within its range as though it were exclusively engineered for the particular work being threaded. The M & S operation shown here is an example of this set-up simplicity. Using only the handbook furnished with the Attachment, a satisfactory production set-up was made by a set-up man with no previous thread-rolling experience.

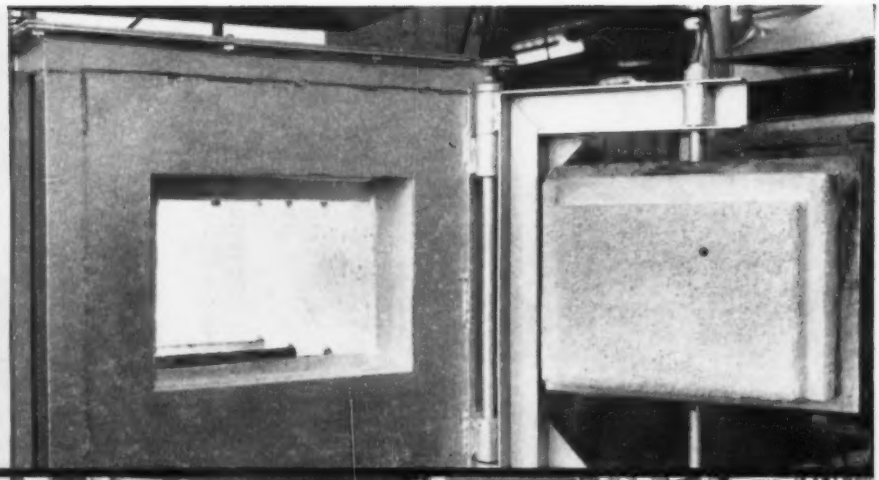
For more detailed information on construction and many exclusive features, send specifications and ask for Bulletin G-96.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

451

LINED WITH ALUNDUM 33-I CASTABLE, this furnace has been used for almost a year as a periodic furnace for high-temperature laboratory test work. During this time the door was opened and closed over a thousand times with the furnace at temperature. Even after this rugged service, the ALUNDUM Castable lining shows hardly any signs of wear.



LINED WITH A COMPETITIVE HIGH GRADE INSULATING BRICK, this similar furnace was used in the same service for an equal length of time. Under equally severe thermal shock conditions the lining cracked and spalled and this furnace must be rebuilt.

You get higher temperature protection with ALUNDUM* castables

Up to 3300° F!

ALUNDUM 33-I Insulating Castable is made up primarily of countless tiny, pure aluminum oxide bubbles. Forming a network of air spaces it provides excellent insulation, even at the highest commercial temperatures.

ALUNDUM 33-HD Heavy Duty Castable is chiefly composed of dense grains of pure aluminum oxide. It is recommended for forming dense monolithic surfaces in constructing many types of furnaces where high temperature conditions are more severe.

Both ALUNDUM 33-I and 33-HD Castables protect at temperatures up to 3300° F and are very easy to mix and use. You can cast simple or complex shapes with them quickly and inexpensively for many installations and replace more expensive pre-fired shapes.

See your Norton Representative for more facts on how these new Castables can provide long, trouble-free service that saves you time and money. Ask him for the folder *Two New Norton Castables*, or write for your free copy to NORTON COMPANY, Refractories Division, 208 New Bond Street, Worcester 6, Mass.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON

REFRACTORIES

Engineered... Rx ...Prescribed

Making better products . . . to make your products better

NORTON PRODUCTS:
Refractories • Abrasives
Grinding Wheels • Grinding Machines
BEHR-MANNING DIVISION PRODUCTS:
Coated Abrasives • Sharpening Stones
Behr-cat Tapes

Teamed Engineering for EFFICIENT SEALDBULK HANDLING

U. S. Rubber Company and American MonoRail Engineers teamed up to develop this system.

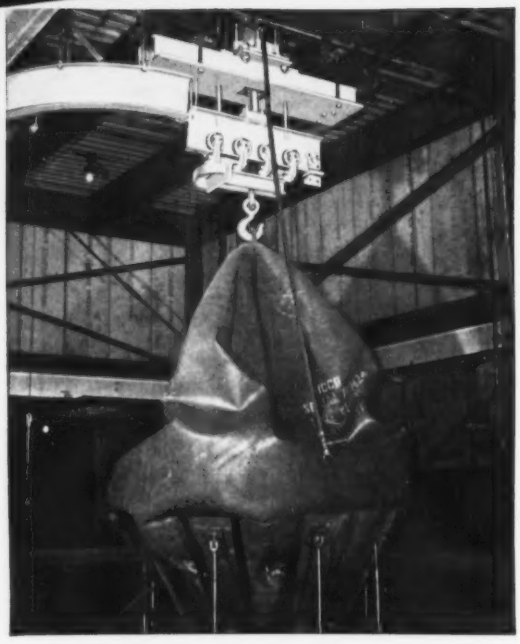
The Sealdbin containers, a product of U. S. Rubber Co., each hold 11,000 pounds of costly carbon black. This American MonoRail System moves the Sealdbins from flat cars or trucks to special stations for discharge. Empty deflated containers are returned to the supplier for re-use.

Working together this expert team has minimized manual labor, time, and waste.

If you have a materials handling problem, call your nearby MonoRail Engineer or write us.

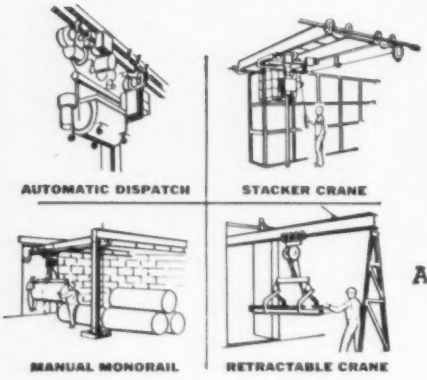
Send for Bulletin C-1.

US RUBBER



Member of Materials Handling Institute and MonoRail Mfrs. Assn.

For Power Driven Conveyors, Use Landahl Chainless Conveyors



AMERICAN MONORAIL COMPANY

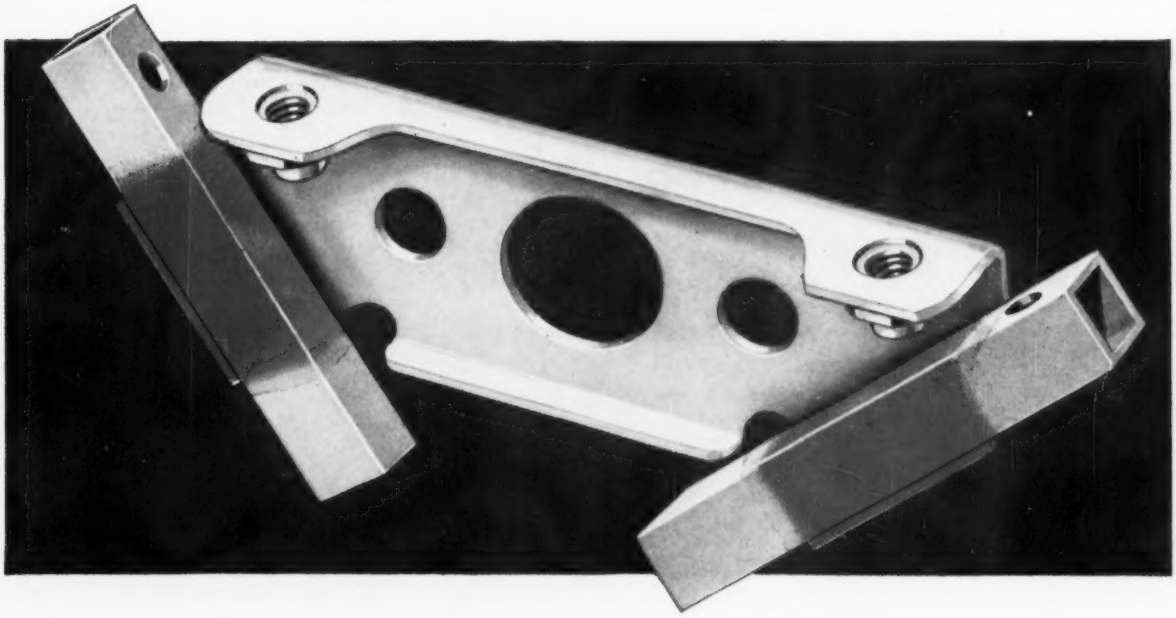
OVERHEAD HANDLING EQUIPMENT

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

(IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

Jack & Heintz Saves $15.84 Per Hour...

with TOCCO® Induction Brazing



Brazing Costs Down—When Jack & Heintz engineers switched from torch brazing to automatic induction, brazing cost of these inverter brush mounts fell from $.05 to $.006 each—a reduction of 83% in direct labor costs alone! Additional savings result because less cleaning is required after TOCCO, and fuel costs are much lower, too.

Brazing Production Up—While costs dropped, production on the part zoomed—from 40 to 360 brazed assemblies per hour. Furthermore, rejects and scrap, formerly high, are now negligible.

Versatility—The part shown is just one of over 25 parts, large and small, which alert J & H engineers have converted from old-fashioned brazing methods to modern, automatic TOCCO. Overall brazing costs (TOCCO brazing versus former methods used) are down 75%—brazing speed, up 100%.

If the manufacture of your product involves brazing, heat-treating, forging or melting of ferrous or non-ferrous metals, don't overlook TOCCO as a sound method of increasing production, improving product quality and slashing costs.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-9, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

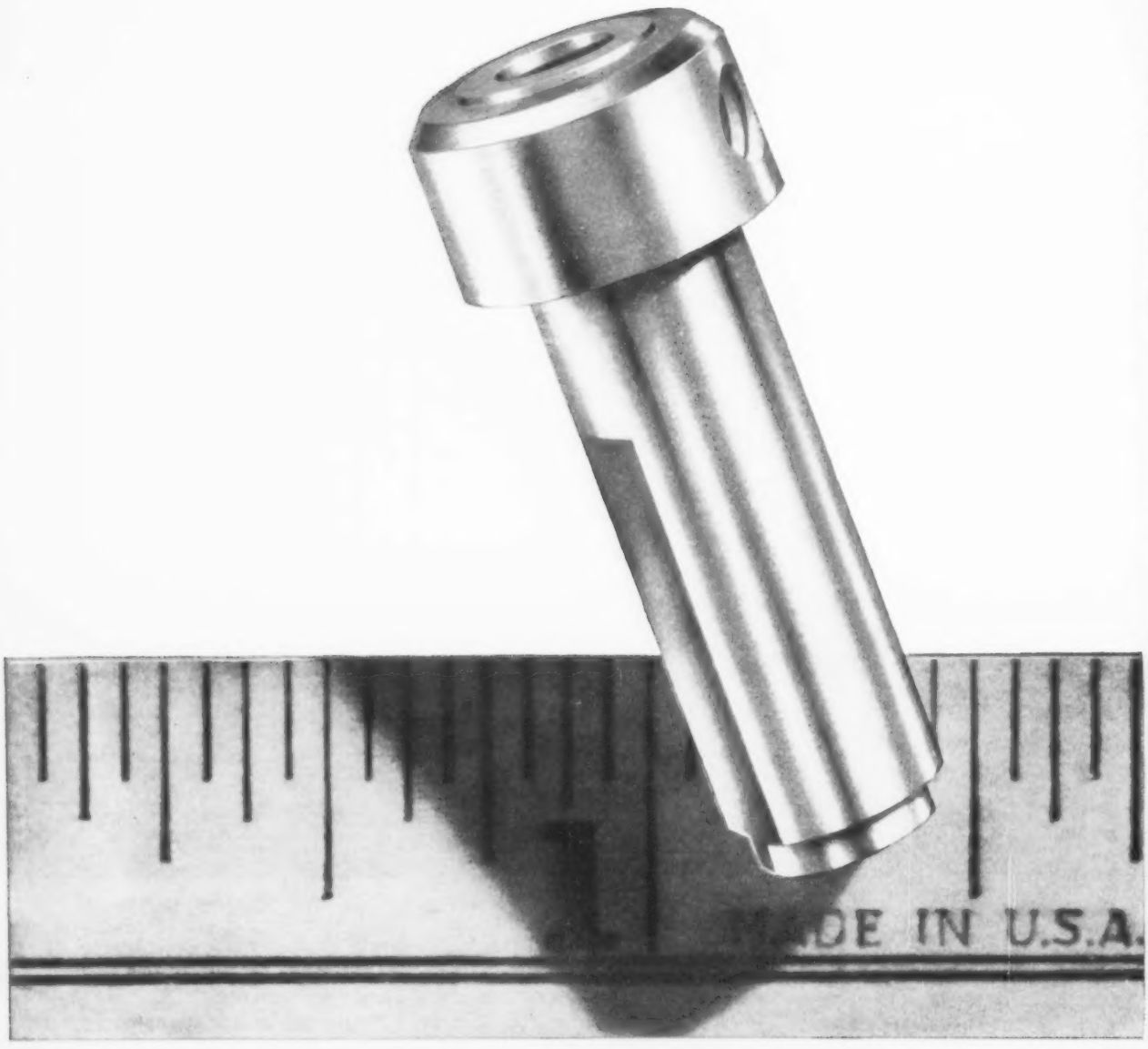
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____



MINNEAPOLIS-HONEYWELL

SAVED $2,350 ANNUALLY

on one part alone when they

SWITCHED TO ALCOA ALUMINUM* SCREW MACHINE STOCK

Mr. Len Mayeron, Chief of Components and Materials Section for Minneapolis-Honeywell, says, "This hub used to be made of cold-finished, free-cutting steel. It was switched to 2011-T3 Alcoa Aluminum Screw Machine Stock and now saves $2,350 annually. Even though steel costs less than aluminum, in this particular situation, savings in machining and scrap salvage more than offset the initial material cost."

If you machine parts from steel or brass, now is the time to take a hard look at these economic facts about aluminum:

1. Aluminum costs less than brass, and machines just as fast.
2. Aluminum machines faster than steel and won't rust.
3. Aluminum scrap allowance is high.

Now is the time to switch to Alcoa® Aluminum. To help you make that switch, call on your nearest Alcoa sales office. For immediate delivery of Screw Machine Stock, contact your nearest distributor. ALUMINUM COMPANY OF AMERICA, 870-J Alcoa Building, Pittsburgh 19, Pa.

HERE IS ACTUAL COST COMPARISON OF $2,350 SAVINGS ON THIS PART

Steel Cost per 1,000 parts:	
78.5 lbs @ 11¢ per lb	$ 8.63
Less 64% scrap @ 1.1¢ per lb	.55
Net cost	$ 8.08 per 1,000
Aluminum Cost per 1,000 parts:	
27 lbs @ 65¢ per lb	$17.55
Less 64% scrap @ 14¢ per lb	2.42
Net cost	$15.13 per 1,000

Steel machine time 7.86 hours per 1,000 parts.
Aluminum machine time 2.60 hours per 1,000 parts.

Labor savings 5.26 hours @ 2.265¢	$11.91
Less difference in material	7.05
Net savings per 1,000 parts	$ 4.86

Annual savings on this single-part total $2,350

IN ENGINEERING, Len Mayeron (Right), Chief of Components and Materials Section, discusses cost reduction with John Kriechbaum, Chief of Design and Development Department. Mr. Mayeron says, "We like Alcoa's technical literature and the way they pitch in and help us with production problems."

IN PURCHASING, Bill Smisek, Assistant Purchasing Agent, says, "Alcoa always meets metallurgical specifications. I seldom have had to reject their material. In emergencies, Alcoa seems to be able to find us extra quantities and give us faster than normal deliveries."

✻LEARN WHY OTHER COMPANIES HAVE SWITCHED TO ALCOA ALUMINUM

Your Guide to the Best In Aluminum Value

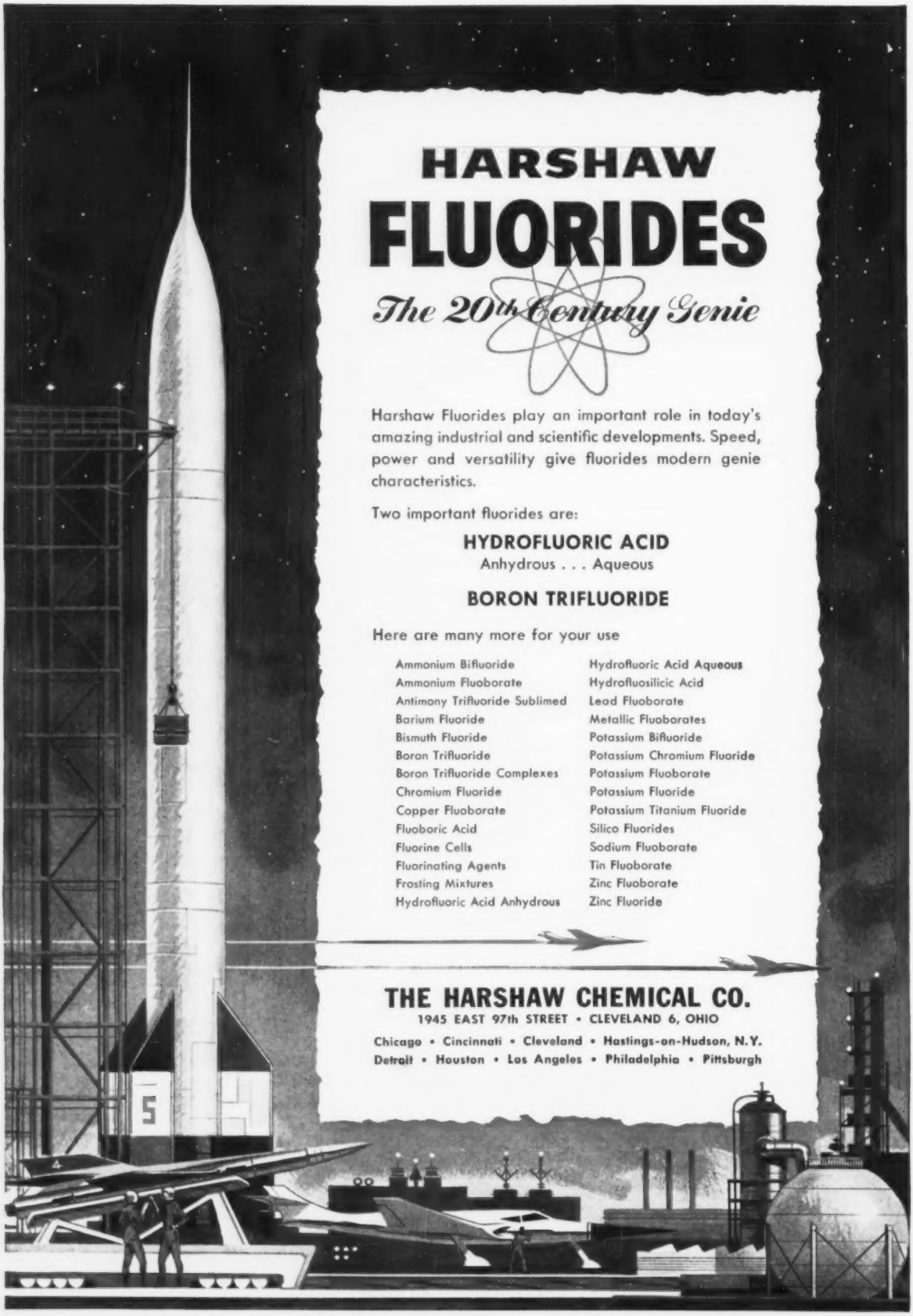
WE CHOSE
ALCOA
ALUMINUM
SCREW MACHINE STOCK
ALUMINUM COMPANY OF AMERICA

THE ALCOA HOUR—Television's Finest Live Drama, Alternate Sunday Evenings.

Direct quotes from leaders in industry on why they buy from Alcoa.

Fill out coupon for your copy.

Name_____
Title_____
Company_____
Address_____
City_____ State_____


HARSHAW
FLUORIDES
The 20th Century Genie
Harshaw Fluorides play an important role in today's amazing industrial and scientific developments. Speed, power and versatility give fluorides modern genie characteristics.
Two important fluorides are:
HYDROFLUORIC ACID
Anhydrous . . . Aqueous
BORON TRIFLUORIDE
Here are many more for your use
Ammonium Bifluoride
Ammonium Fluoborate
Antimony Trifluoride Sublimed
Barium Fluoride
Bismuth Fluoride
Boron Trifluoride
Boron Trifluoride Complexes
Chromium Fluoride
Copper Fluoborate
Fluoboric Acid
Fluorine Cells
Fluorinating Agents
Frosting Mixtures
Hydrofluoric Acid Anhydrous
Hydrofluoric Acid Aqueous
Hydrofluosilicic Acid
Lead Fluoborate
Metallic Fluoborates
Potassium Bifluoride
Potassium Chromium Fluoride
Potassium Fluoborate
Potassium Fluoride
Potassium Titanium Fluoride
Silico Fluorides
Sodium Fluoborate
Tin Fluoborate
Zinc Fluoborate
Zinc Fluoride
THE HARSHAW CHEMICAL CO.
1945 EAST 97th STREET • CLEVELAND 6, OHIO
Chicago • Cincinnati • Cleveland • Hastings-on-Hudson, N.Y.
Detroit • Houston • Los Angeles • Philadelphia • Pittsburgh

They got what they wanted with

DANLY

PRESSES

SEE HOW ONE LEADING MANUFACTURER DOUBLED LAMINATION PRODUCTION

Production of motor lamination stampings was actually more than doubled—from 100,000 to 230,000 units per press per day—from each of five new Danly Autofeeds. High precision carbide dies have a life expectancy of 200,000,000 pieces . . . even stoppages for die maintenance have been reduced by 80%.

If you want speed, dependability, big volume and small unit cost, you'll get what you want with Danly Autofeed Presses. See how you can increase stamping production in your shop. You'll want the whole story. Send for this catalog with all the details including press specifications and drawings. Write today to DANLY MACHINE SPECIALTIES, INC., 2100 S. Laramie Ave., Chicago 50, Ill.

DANLY®

24% savings in finishing costs and better forming with Formbrite

FINE DESIGN and a rich luster finish are the main sales features of the quality brassware manufactured by Coronet Brass, Incorporated, New York City.

Coronet's finishing operations, therefore, are of primary importance. Hearing about the outstanding polishing characteristics of Formbrite®, Anaconda's superfine-grain drawing brass, the company placed a trial order. The planter, jardiniere, and "leather-on-brass" waste basket shown above were among the first products made of Formbrite.

After several months of operation, Mr. Maurice Schulman, owner of Coronet Brass, summarized the company's experience with Formbrite as follows:

1. "We estimate that there is a saving of approximately 24% in our initial cutting operation, which represents about three-quarters of the complete finishing operation for our brassware.

2. "We further estimate that there is an approximately 20% difference in the color-buffing operation—the final step before the brass is lacquered.

3. "We have found that, on a small beading operation performed on one of our items, there is a time saving of about 50% due to the fact that Formbrite does not wrinkle as does regular brass in our automatic beading machine. The operation used to call for extreme vigilance, wasted much time. Now this substantial saving is possible because of Formbrite's springiness."

Formbrite
Superfine-grain drawing brass
an ANACONDA® product
made by
The American Brass Company

Find out for yourself. Formbrite is a premium product, yet it doesn't cost a penny more than ordinary drawing brass. Try it and see for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you cut costs and make a better product. Get a sample or a trial batch. See your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont., Canada.

5774

Look at the Savings 3 Allis-Chalmers Lift Trucks Give Michigan Screw Products Co.

Direct cost reductions totaling thousands of dollars per year were realized when three Allis-Chalmers fork lift trucks replaced other power trucks, hand trucks and manual handling at Michigan Screw Products Co., Center Line, Mich. Here are typical savings:

Faster unloading — Unloading coils of rod formerly took several men up to two hours — now *one* man on a ram-equipped fork truck does it in an hour or less.

Workmen released for other work—two of the four men previously required in the raw material department have been released for other work.

Volume INCREASED, costs DECREASED — the three Allis-Chalmers trucks, and the palletized handling methods they made possible, have effected savings of several thousand dollars annually, *with a 40 percent increase in tonnages handled!*

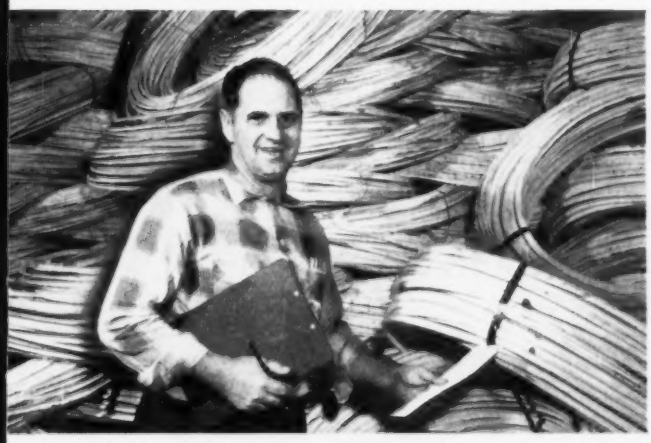
Truck maintenance reduced — the cost of maintaining Allis-Chalmers lift trucks is nearly one-third less than with the lift trucks previously used — and they are back in service faster.

Safer working conditions — With fewer men involved in handling materials, there is less danger of accidents. Handling with Allis-Chalmers fork trucks has proved to be safer than other handling methods.

Trucks work 18 hours daily, 5 days a week

The three Allis-Chalmers trucks are on the go 18 hours per day, 5 to 6 days per week, unloading coils of rod from semi's, stacking and warehousing, moving parts in work, and loading outgoing shipments. Being in continuous service, their ability to stay on the job is especially important. That's one reason Allis-Chalmers trucks were selected by Walter E. Zawada, Vice-President.

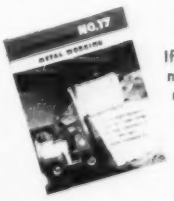
They all like the Allis-Chalmers fork trucks



"They're brutes for punishment," commented Ernest Brown, Production Manager, "they are used to lift weights well beyond their rated capacity, yet stand the punishment very well."

"Maintenance costs are nearly one-third less than they were with the other fork trucks," says Walter E. Zawada, Vice-President. "Used to replace an engine a year — haven't replaced any in the Allis-Chalmers trucks."

"Feels like a car with power steering," says Arthur B. Wiley, Materials Handler, about the Allis-Chalmers 4,000-lb fork truck with which he is tiering finished bolts. He also likes the clear floor, and the ease of getting on or off the truck — either side.



Send for complete case study

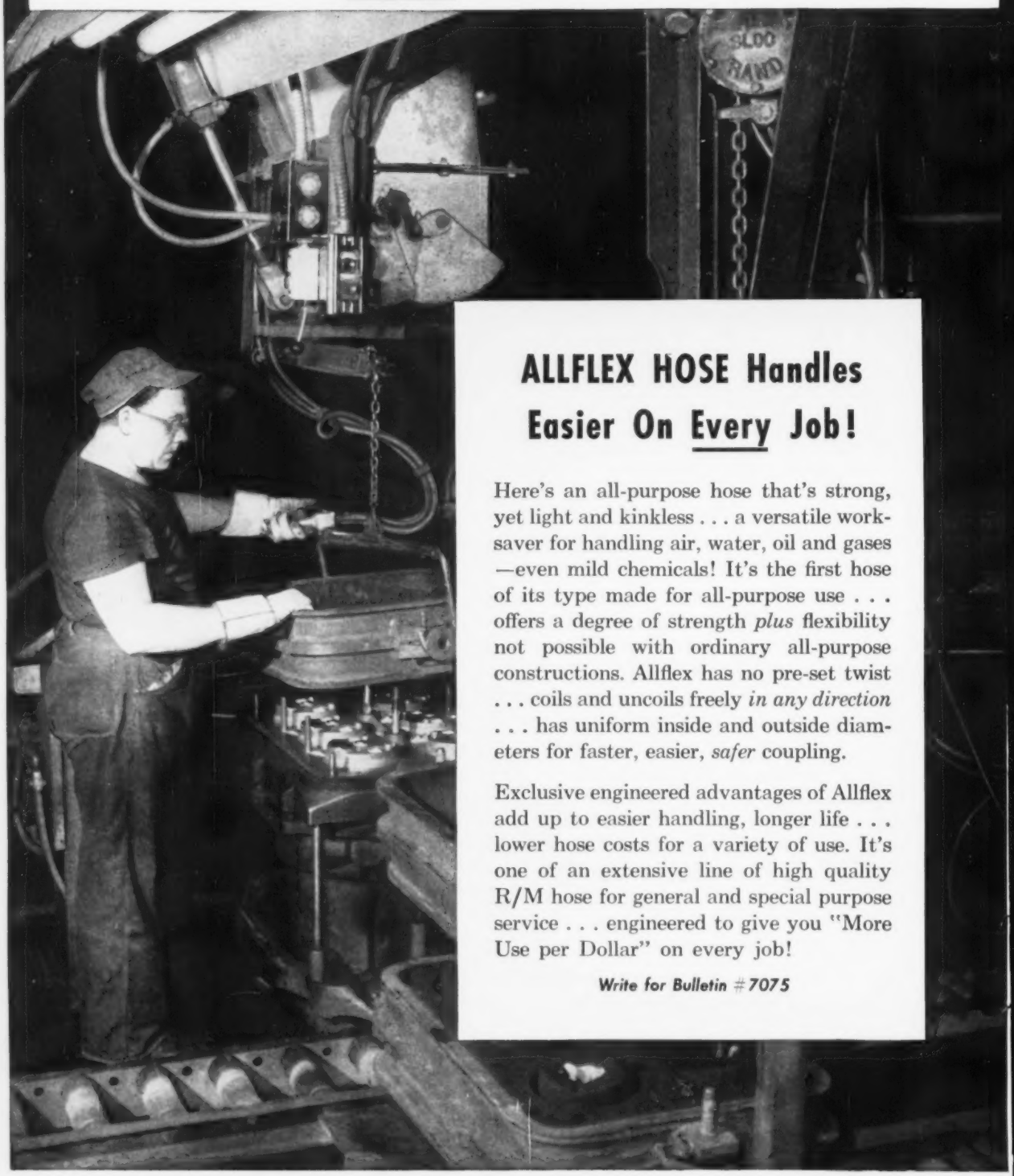
If you would like a complete 4-page case study telling in more detail how Michigan Screw Products Co. handles materials efficiently and economically to save many thousands of dollars annually, ask your Allis-Chalmers material handling dealer for Case Study No. 17 — or write direct for your copy.

ALLIS-CHALMERS, MATERIAL HANDLING DEPT.,
BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BH-48

USERS SAY R/M RUBBER PRODUCTS



ALLFLEX HOSE Handles Easier On Every Job!

Here's an all-purpose hose that's strong, yet light and kinkless . . . a versatile work-saver for handling air, water, oil and gases —even mild chemicals! It's the first hose of its type made for all-purpose use . . . offers a degree of strength *plus* flexibility not possible with ordinary all-purpose constructions. Allflex has no pre-set twist . . . coils and uncoils freely *in any direction* . . . has uniform inside and outside diameters for faster, easier, *safer* coupling.

Exclusive engineered advantages of Allflex add up to easier handling, longer life . . . lower hose costs for a variety of use. It's one of an extensive line of high quality R/M hose for general and special purpose service . . . engineered to give you "More Use per Dollar" on every job!

Write for Bulletin #7075

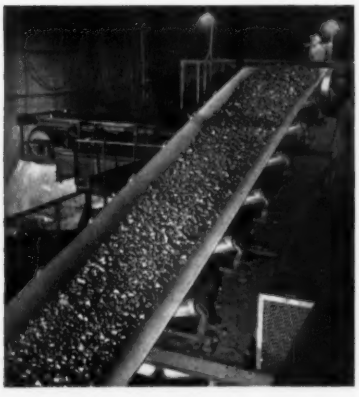
GIVE YOU "More Use per Dollar"

R/M CONVEYOR BELTS... You Name the Service

Whatever material or products you are conveying, chances are R/M has the rubber conveyor belt engineered specifically for the job. Ray-Man Conveyor Belt, for example, is designed for heavy loading of bulk materials. Strength Members are cushioned. Double compensation relieves stress on outer plies . . . This assures extra flexibility even where relatively thick, narrow belts are used or where pulleys are small. Use of newest synthetic super-strength fibers means greater service than ever before . . . holds fasteners under the most severe conditions . . . requires no breaker ply. Like all R/M heavy duty conveyor belts, Ray-Man is moisture-resistant . . . mildew-proof . . . protected against wear, tear, cuts and abrasion with R/M's exclusive "XDC" Cover!

An R/M representative helps you select the best construction for "More Use per Dollar" on your job.

Write for Bulletin #6915



More Power in Less Space... if it's R/M POLY-V® Drive!

This entirely new, patented, power transmission drive features a *single, endless* parallel V-ribbed belt running on sheaves specially designed to mate precisely with the belt ribs. The results? *Uniform* belt pull, *even* distribution of drive load . . . highest horsepower capacity per inch of drive width. Gives you up to 50% more power than a conventional V-belt drive of equal width . . . or the *same* power in as little as ⅔ the space!

Belt matching problems are eliminated . . . belt speed ratio and belt position remain more constant from no load to full load for smoother, cooler running, less wear. Just *two* cross sections of Poly-V* Belt meet *every* heavy duty power requirement.

Write for Poly-V Drive Bulletin #6638

**Poly-V is a registered Raybestos-Manhattan trademark.*

IF YOU USE V-BELTS, SPECIFY CONDOR OR R/M SUPER-POWER

The "Smoothest Running V-Belts Made"

RM-700

BELTS • HOSE • ROLL COVERING • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

CINCINNATI
PRESS BRAKES

There are over 80 standard machines in the Cincinnati Press Brake line, ranging in length from 4′ to 20′ between the housings. 15 different tonnage capacities are available. Although they differ widely in size and capacity, they all have one feature in common . . . ***accuracy.***

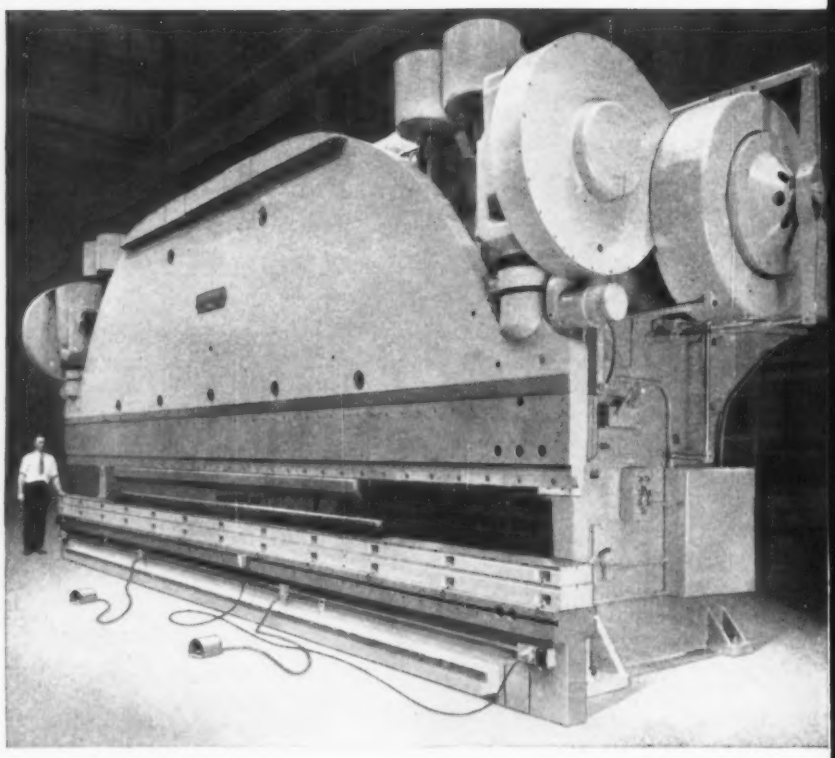
This isn't an unsupported claim. The accuracy of the thousands of Cincinnati Press Brakes in operation has been time-proven . . . just check the production record of any one of them. A few of the features which contribute to this accuracy are:

All-Steel, interlocked construction—no welds used as load supports, yet the bed is directly supported by the housings.

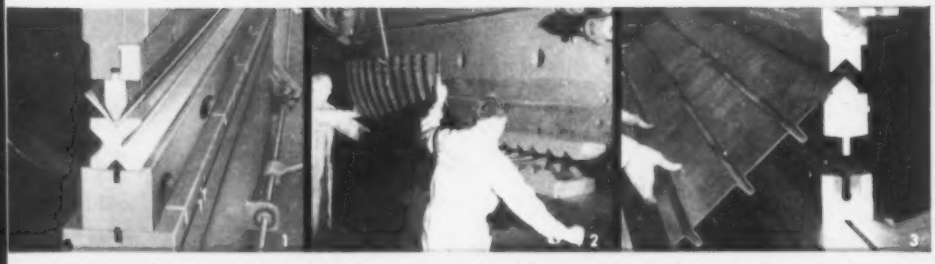
Centerline loading—no weaving of the frame, since forces are contained within the housings.

Deep beds and rams—depth in these members means rigidity, and rigidity means accuracy.

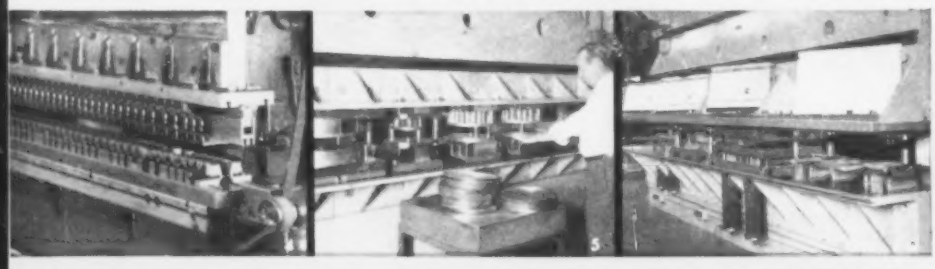
Write Dep't. B for Catalog B-5.



AND . . . . PRESS BRAKE DIES



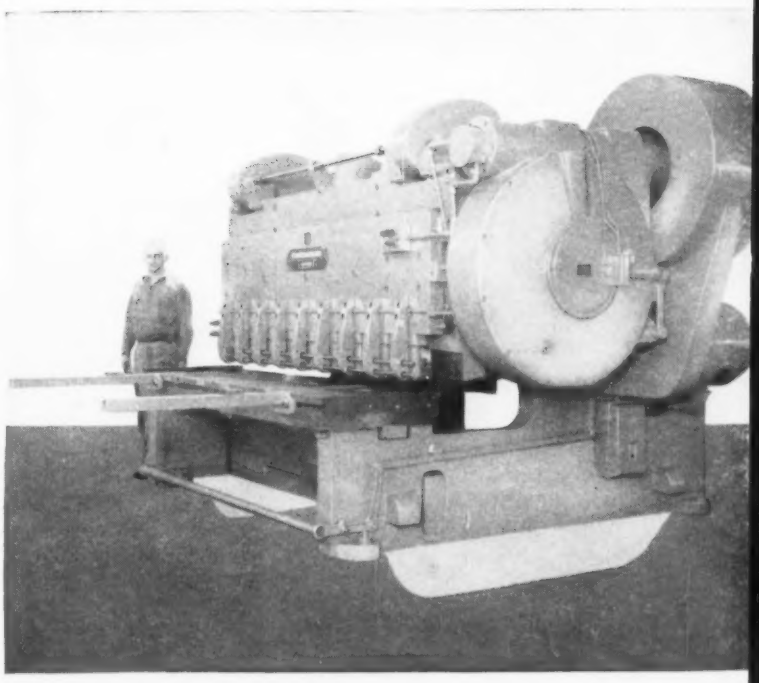
A 4-way die, equal to 4 V-dies, is shown in No. 1. No. 2 shows culvert sections being formed in repeat hits. Roof decking is made with the dies shown in No. 3.



No. 4 shows a punching setup with gags. The progressive setup in No. 5 does punching and drawing. The progressive setup in No. 6 makes refrigerator top parts.

We are prepared to design and furnish the tooling needed to convert your ideas into finished products. A background of 30 years of experience is represented in our Application Engineering Department, in literally every field associated with our machines. The photos at the left show just a few examples. For complete information, write Dep't. B for Catalog D-2.

CINCINNATI SHEARS

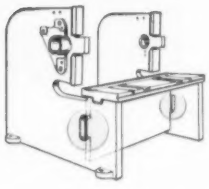


Cincinnati All-Steel Shears combine micrometer accuracy with high speed operation. Straight and parallel cuts are consistently produced, so accurately that only a micrometer can detect any variation in width of the sheared piece.

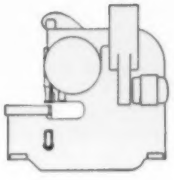
This accuracy doesn't call for special skill or manipulation on the part of the operator. As a matter of fact, Cincinnati Shears are built to cut all thicknesses, from thin material up to capacity, ***without changing knife clearance.*** This prevents accidental damage and eliminates interruptions in production.

Dependability, equally important, is insured by Cincinnati interlocked construction. No welds are used as load supports, yet the bed is directly supported by the housings. All-steel frame members minimize deflection.

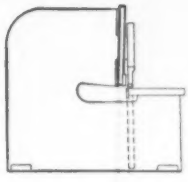
The sketches below show a few important features. For full information, write Dep't. B for Catalog S-7R.



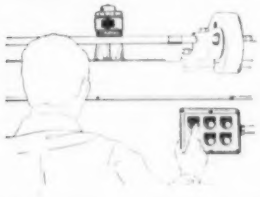
Interlocked construction means no welds used as load supports



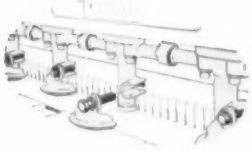
Gap frames allow shearing pieces longer than the machine



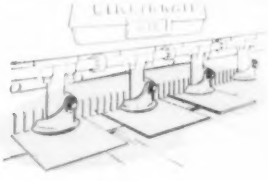
Inclined ram offsets the thrust caused by shearing action.



Front-controlled power back gauge is accurate, fast, convenient.



Hydraulic holdowns exert tons of pressure, insure accuracy.



Different gauges, held with same tonnage, can be cut together.

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Fire is a fighting word for the Navy's flattop fleet. In mere minutes it can engulf the biggest carrier. And once it hits the catapults or the deck-edge elevators that lift planes topside for launching, the carrier's striking force is nil.

Four years ago, Houghton solved the Navy's problem of fire-resistant hydraulic fluids for catapults with Houghto-Safe 620. This water-glycol fluid has been serving the Navy ever since—and has earned first place in industry as well.

But the Navy still had a problem with hydraulic deck-side elevators. It needed a hydraulic fluid that could withstand extremely high bearing pressures . . . a fluid with oil-like efficiency, yet fire-resistant.

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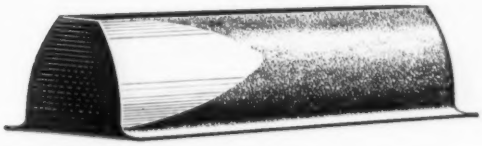
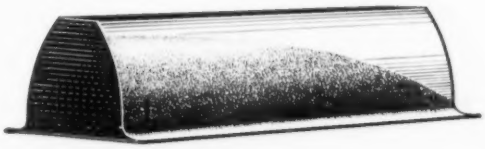
Hard Gear Honing

GIVES YOU BETTER GEARS AT LESS COST

QUICK GEAR INSPECTION

One quick pass with a Red Ring honing tool cleans up the teeth or immediately reveals heat-treat distortions, thus indicating corrective adjustments in the gear forming processes.





CORRECTION OF HEAT-TREAT DISTORTIONS

Minor distortions in tooth profile, helix, index and runout are corrected in from 15 to 60 seconds of honing time.

IN ADDITION

Gear honing provides:

- The Lowest Cost Remedy for Nicks and "Hickies"
- Improved Tooth Surface Smoothness
- Overall Sound Improvement

For Quality Gear Production, write for Bulletin H57-2 which gives the full story on Red Ring Hard Gear Honing.

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Here is DoALL's Faster, more Accurate and Economical way to handle your CUT-OFF JOBS!

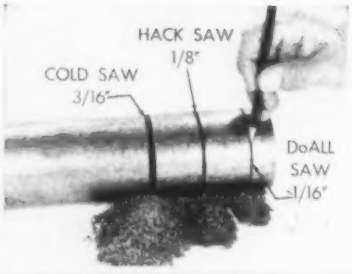
New Low Cost DoALL Model C-12 Offers PLUS Values:

FAST CUTTING—Up to *twice as fast* as a power hacksaw . . . up to 6 times as fast as other band saws . . . cuts all tough machinable metals!

ACCURATE—Continuous-cutting *high-speed steel* saw band has guaranteed tooth set of ±.002" to give you exceptional accuracy and finish!

LOW PRICED—*Costs very little more* than light-duty cut-off band saws that use only carbon steel blades . . . and *costs much less* to buy and operate than power hacksaws of comparable power and size!

New DoALL Model C-12 "utility" Power Saw (12" x 12" capacity for stock weighing up to 1500 pounds), featuring *High-Speed Steel* saw bands.



BIG MATERIAL SAVINGS

Thin Demon blade reduces stock waste —gives you a substantial "material-saved" bonus with every cut!

FREE DEMONSTRATION

Call DoALL locally today for a free "in-your-plant" demonstration, or send for free "Power Sawing Handbook" which describes new cost-reducing improvements in modern sawing methods and machines.

Here is DoALL's low priced Power Saw that outperforms power hacksaws of comparable capacity! Why? Because of the continuous-cutting band saw principle, its precision construction, rigidity and power—combined with new DoALL Demon *high-speed steel* saw bands.

The continuous-cutting Demon HSS saw band withstands cutting temperatures up to 1100° without losing tooth hardness. It cuts mild steel at 10 sq. in. per minute. And there's no metal too tough for this blade —it cuts right into titanium, stainless alloys, Ni-resist and other metals. Investigate how this "integrated" combination of blade and machine can help reduce your cut-off costs. Stock handling equipment is optional.

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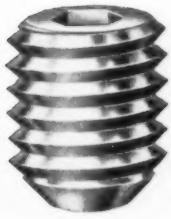
how to  keep costs down

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But our engineers have found, from a good many years of experience, that designs frequently call for *special* hex-socket cap and set screws that are only slightly "off-standard." These specials take longer to get, cost more.

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*ALLEN **manufactures 1457 *standard* items**

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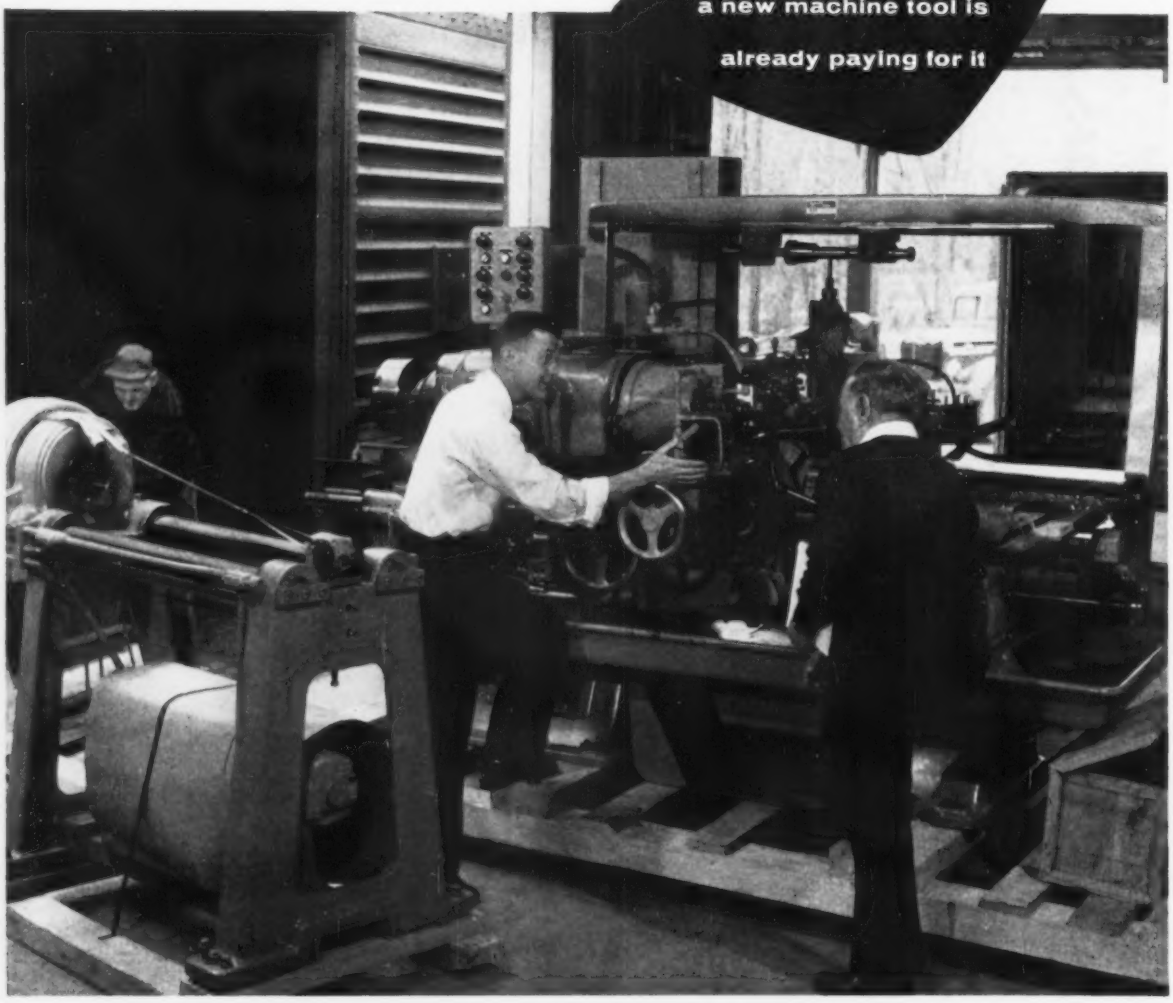
the man who needs a new machine tool is already paying for it



Blessed Event, Plant-Style

They're passing out cigars in the front office. And here on the delivery platform, the production V.P. is on hand personally to welcome the new arrival . . . a J & L Turret Lathe.

Beaming grins like his can be seen throughout the plant, and with good reason: everyone figures to benefit from this new equipment. The operator's job is made easier, and his opportunities for increased compensation are better. Production management can start right away on those new production estimates, and begin planning further improvements. Top management knows that the competitive position of the company is stronger. And right down the line, that profit-sharing plan looks sweeter than ever.

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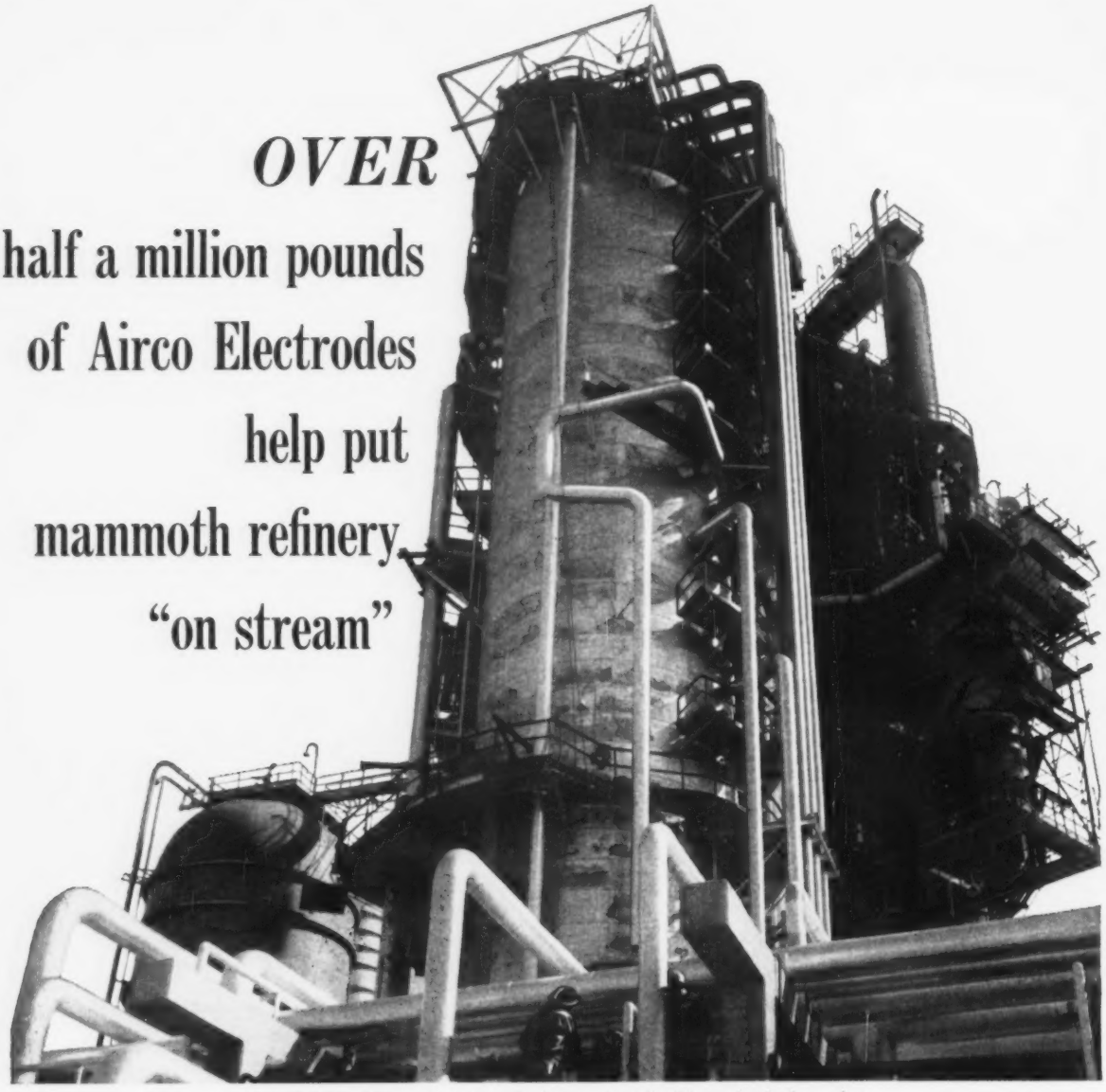
half a million pounds of Airco Electrodes help put mammoth refinery "on stream"



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The Tidewater Delaware Refinery is the largest plant of its kind ever built at one time. An indication of its size is that each barrel of crude oil or partly processed liquid travels through nearly 250 miles of installed piping by the time it reaches the gigantic product storage tanks.

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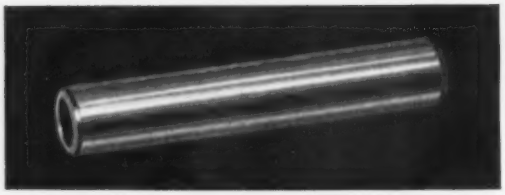
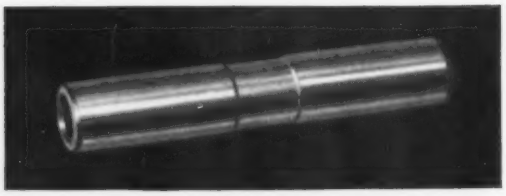
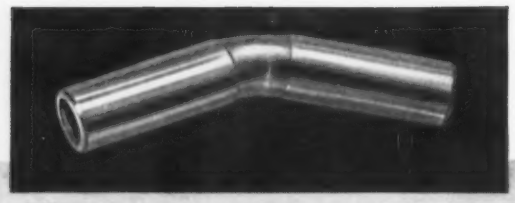
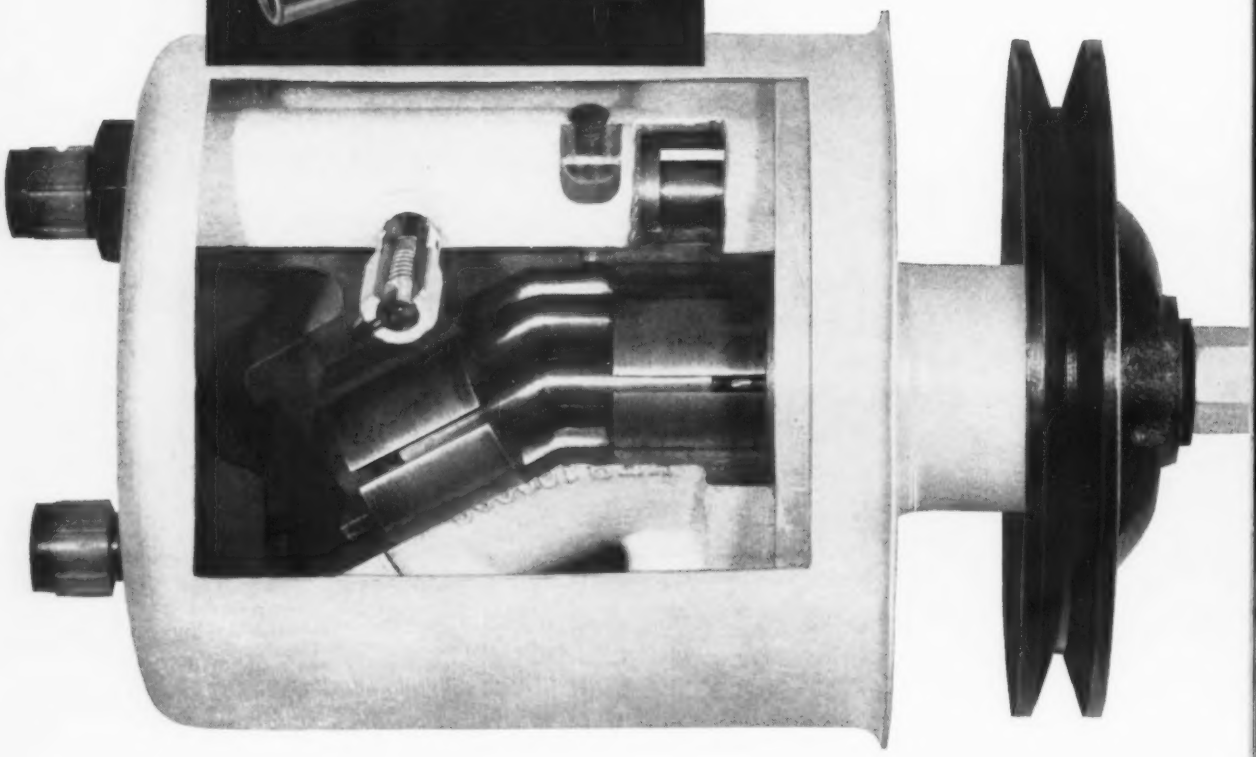






Republic

Unusual ductility and uniformity of Republic ELECTRUNITE Mechanical Tubing makes possible the assembly of this automotive hydraulic power pump, designed and assembled by Thompson Products, Inc. Finished O.D. is to ± .0003 inches.



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ELECTRUNITE Mechanical Tubing

meets all close tolerance requirements for new Thompson Products Automotive Pump!

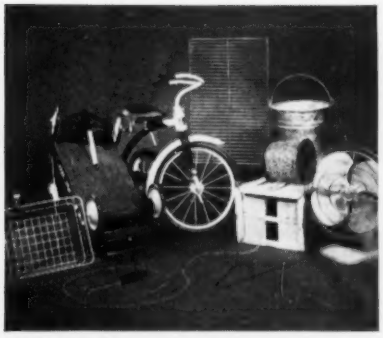
Close tolerance, uniformity, ductility, workability – four important performance requirements, all reasons why Republic ELECTRUNITE Mechanical Tubing is used in a new automotive hydraulic power pump assembly.

Designed and assembled by Thompson Products, Inc., Cleveland, Ohio, this pump furnishes power for power steering featured by a nationally famous automobile manufacturer.

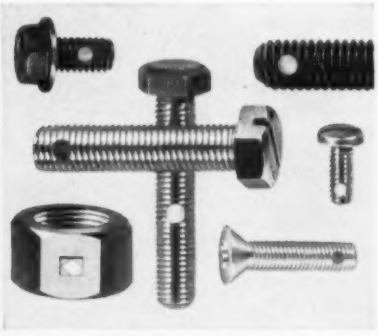
Will-O-Hill Industries, Inc., Willoughby, Ohio, subcontractor, manufacturers, and specialists in close tolerance tubular stampings, cut $\frac{7}{16}$-inch-diameter Republic ELECTRUNITE Mechanical Tubing into units $2\frac{3}{16}$ inches long. Each unit is rolled to form a slight groove in the center, and bent to an angle of exactly 150°. Nine such pieces are used in each pump assembly.

Both ends are subsequently bent in a die, held to a tolerance of ± .0005 inches and finished with an O.D. to ± .0003 inches. This close tolerance represents outstanding workability, using manufactured tubing as base stock.

This is another example of how Republic engineers are able to work with you in solving precision problems and reducing costs through the unusual uniformity and ductility of Republic ELECTRUNITE Mechanical Tubing. For additional information, send coupon or write today!



UNIFORM ROUNDNESS AND SURFACE FINISH are reasons why Republic Manufacturers Wire is specified for the most difficult fabrication requirements. Up-to-date machinery and methods, skilled laboratory control, and careful inspection, assure every purchaser of a material that will suit his specific needs. Manufacturers producing a wide variety of items have found Republic Wire a valuable aid in minimizing losses, stepping up production, and increasing the salability of their products. Mail coupon for complete details.



MEET SEVERE REQUIREMENTS for maximum holding power with Republic Nylok Bolts and Nuts, specifically designed for bolted assemblies that must be vibration-proof and adjustable. Resilient nylon insert permanently embedded in the fastener provides re-usability, eliminates lost motion of assembling extra locking devices. Nylok Bolts and Nuts can be either hand or power wrenched. Republic offers manufacturers more than 20,000 standard and 8,000 special types and sizes of fasteners to meet practically any fabrication-assembly.

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- ☐ Republic Cold Finished Steel Bars
- ☐ Republic Nylok® Bolts and Nuts
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A NEW STARRETT
HIGH SPEED STEEL BAND SAW

NEW

Starrett®

SAFE-FLEX®

HIGH SPEED STEEL BAND SAW

CUTS UP TO 10 TIMES FASTER • LASTS UP TO 30 TIMES LONGER

The finest band saw available today, this new Starrett Safe-Flex® High Speed Steel Band Saw substantially lowers costs through faster cutting at higher speeds and heavier feeds, plus greater tool life and minimum metal removal.*

It provides a cutting tool of highest quality *high speed steel*, heat treated by new techniques to produce a band of graduated hardness from super-hard teeth to a super-tough, flexible back. Ends are welded by new methods that produce a weld as strong as the parent metal.

Cuts Faster, Lasts Longer. Exhaustive tests, in our own and steel company laboratories and in large plants in many industries, prove that the new Starrett Safe-Flex® High Speed Steel Band will cut up to 10 times faster with up to 30 times longer band life. You get continuous, high speed cutting with greatly reduced down time costs. Bands pay for themselves over and over.

Red-Heat Hardness. Red-heat hardness permits heavier feeds, higher speeds. This new band stays hard even at temperatures up to 1100° F. Greater tensile strength lets you use more tension, heavier feeds and higher speeds for faster, safer cutting of harder and tougher materials.

Accurate, Efficient Cutting with Minimum Metal Removal. Band thicknesses are only .025" to .042" — far thinner than other high speed cutting tools. Extra thin section means faster cutting with less power and less chip loss — ideal for all cut-off work and for severing or slicing finished or semi-finished work.

Tooth and gullet design, engineered for maximum tooth strength, uniform stress distribution and efficient chip flow, plus sharper precision-cut teeth set with controlled accuracy, assures straight, accurate cutting with a fine finish.

Recommended for . . . Starrett Safe-Flex® High Speed Steel Bands are recommended for production cut-off work on tool and die steels and all ferrous alloys including: carbon steels, free machining steels, alloy steels, tool steels, stainless . . . also titanium and other hard-to-cut metals.

They are available through your Industrial Supply Distributor in Regular, Skip-Tooth and Hook-Tooth types in four widths and a wide variety of pitches. Call him for quality products, dependable service . . . or write for complete information. Address Dept. IA, The L. S. Starrett Company, Athol, Mass., U.S.A.

**When used on machines designed for high speed steel band saws.*

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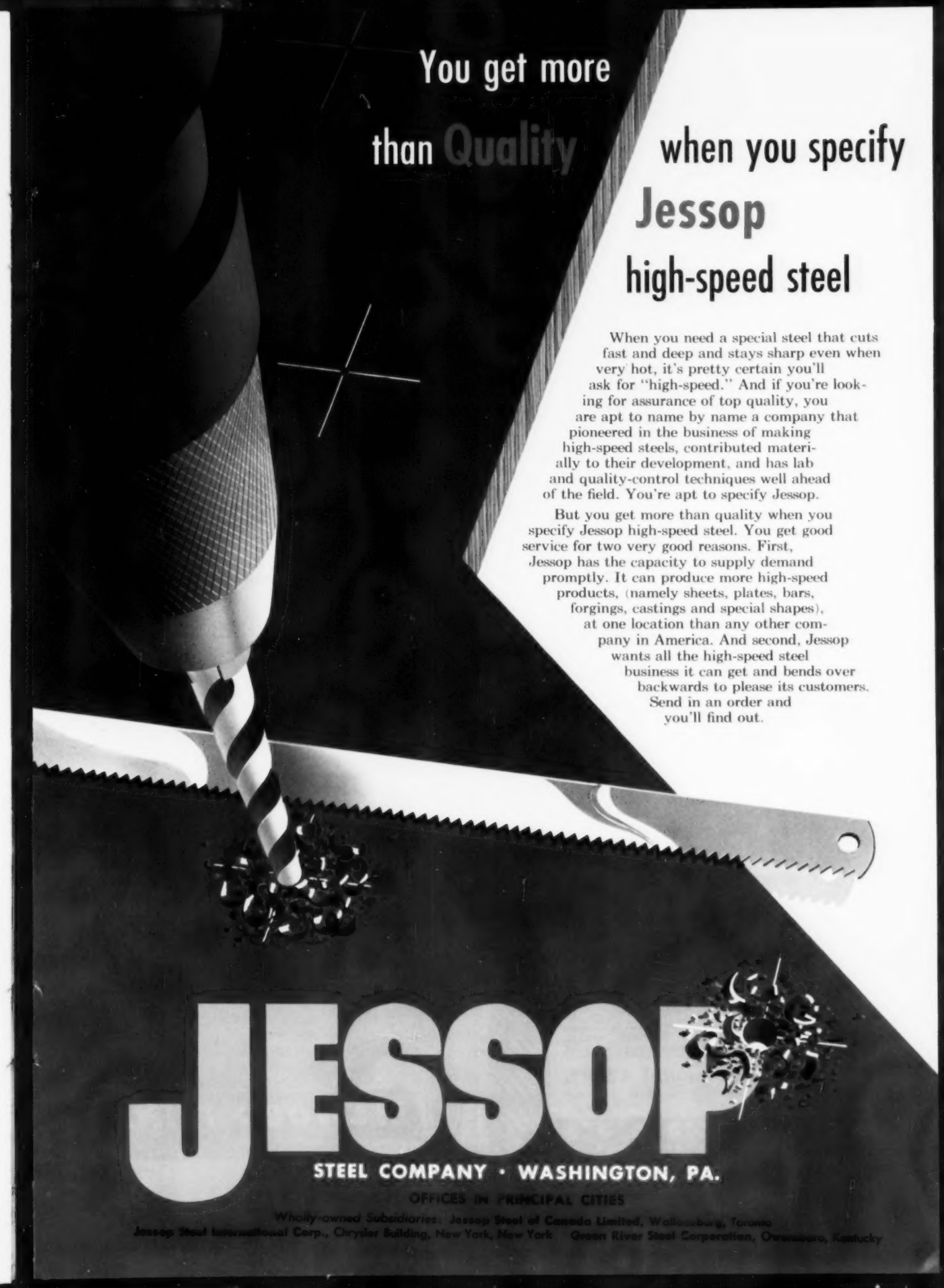
PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK • HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES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When you need a special steel that cuts fast and deep and stays sharp even when very hot, it's pretty certain you'll ask for "high-speed." And if you're looking for assurance of top quality, you are apt to name by name a company that pioneered in the business of making high-speed steels, contributed materially to their development, and has lab and quality-control techniques well ahead of the field. You're apt to specify Jessop.
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You name the job or jobs to be done! We'll supply a crane or cranes that will do it. Standard Models in a wide range of styles, sizes and capacities will generally meet your requirements. If not, we'll engineer and build what you need. We've been doing it for more than 40 years.

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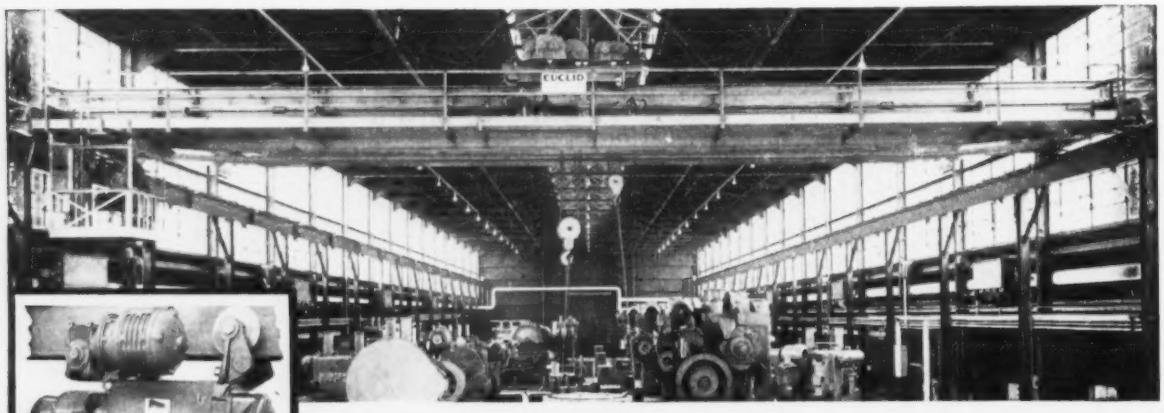

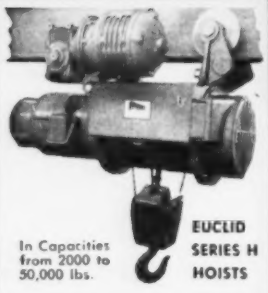

In Capacities from 2000 to 50,000 lbs.

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EUCLID HOISTS are highly efficient and strictly modern in every detail with oversize anti-friction bearings and heat treated steel parts in combination with a welded frame.

The planetary gearing and mechanical load brake are mounted in oil tight housings. The hoist gearing is assembled in the hoist drum.

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PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure sastisfaction.

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BRASS. ZINC. ANY METAL. ANY PURPOSE

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ARMSTRONG T-SLOT CLAMPS

Make rigid set-ups in minutes on planers, drill presses, milling machines or other T-slotted beds or platens. Clamp slides or rotates to position on anchoring T-slot bolt. Drop forged, heat-treated body. Heat-treated screw has V-slotted swivel cap.

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ALL SIZES, pressed . . rolled . . extruded . . forged to accurate specifications from carbon, alloy, stainless steels and special metals. Modern metallurgical, die, heat-treating and rough machining facilities.

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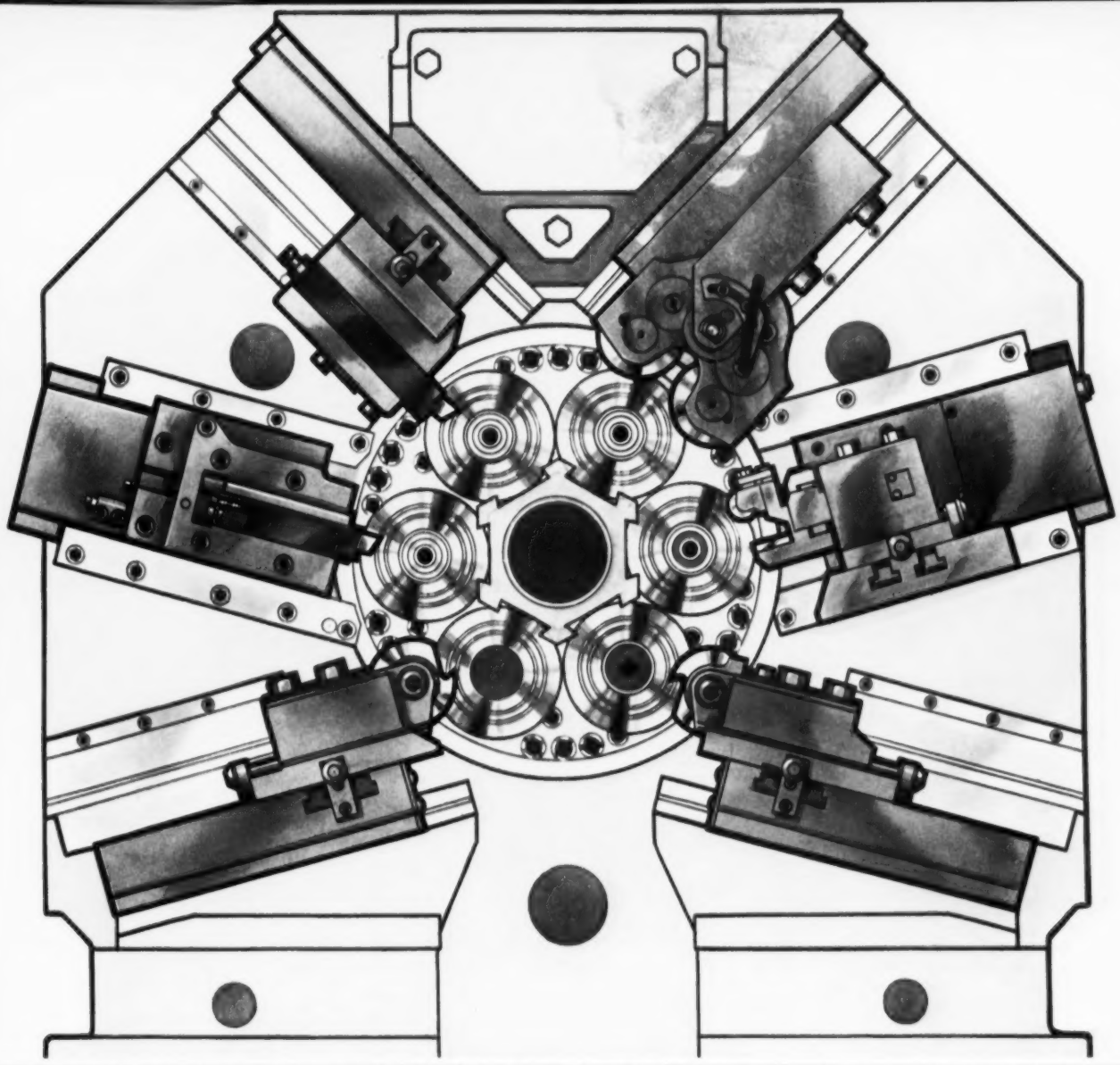
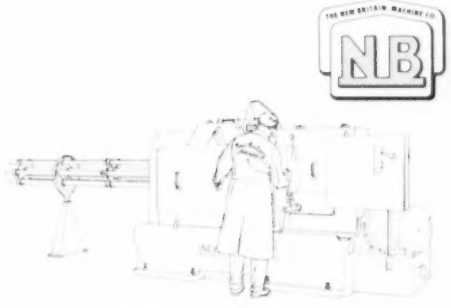
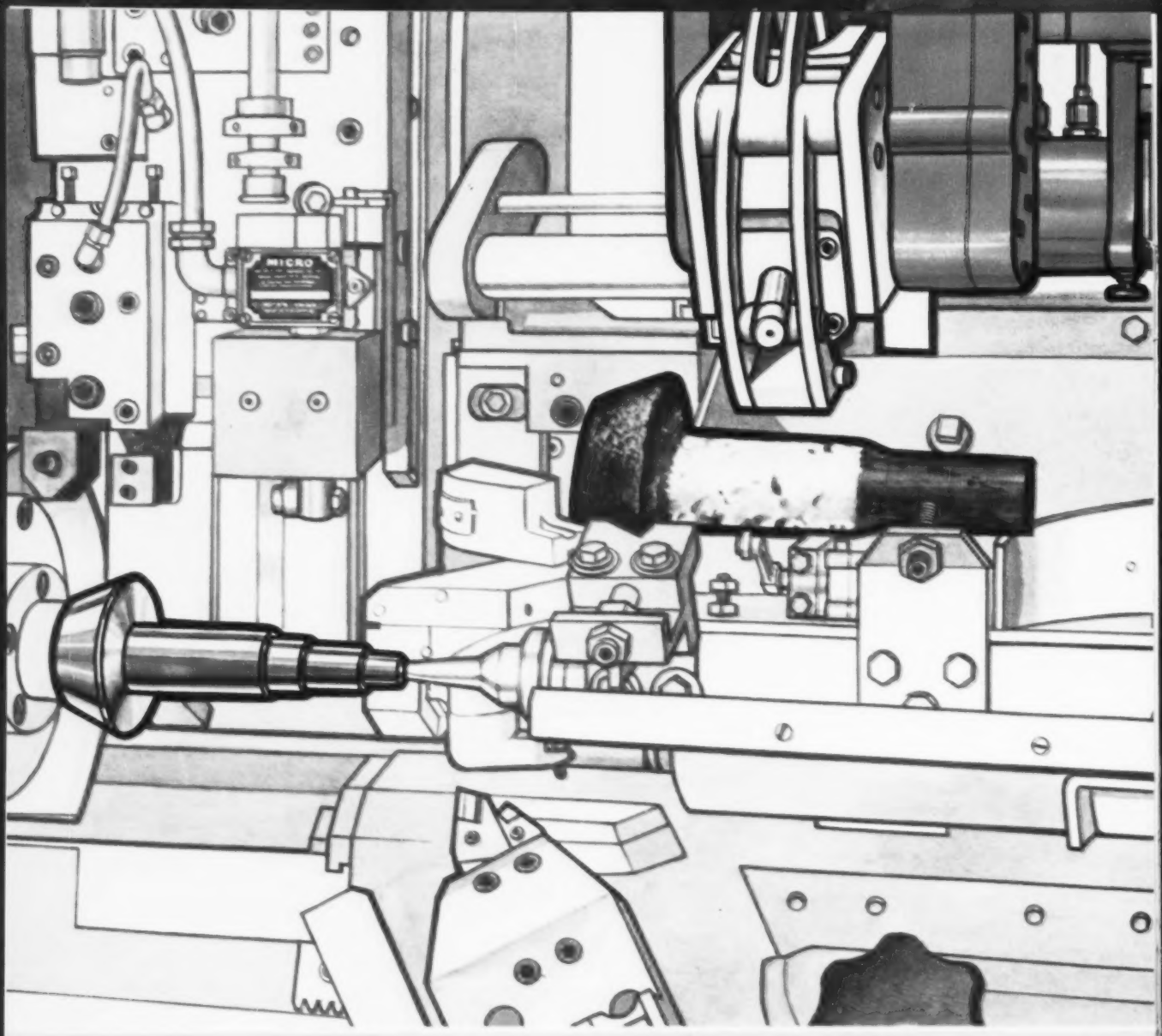


six spindles — six cross slides

Here you see the possibilities for new flexibility of bar machine set-ups with *a cross slide in every position.* Six independent cross slides. More operations on one bar machine. Six independent radial cross slides for forming, roll threading, shaving, skiving, angular facing, knurling, hobbing and undercutting with simpler tools and attachments, through the use of cross slides. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



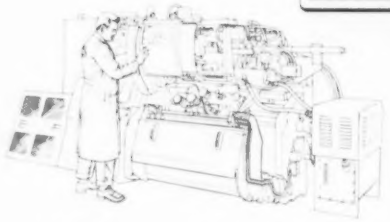
Automatic Bar Machine



no hands — no headaches

Automatic loading of forgings, bar slugs and bar stock is a basic optional design feature of New Britain +GF+ Copying Lathes. It saves labor and makes a substantial reduction in production time per piece.

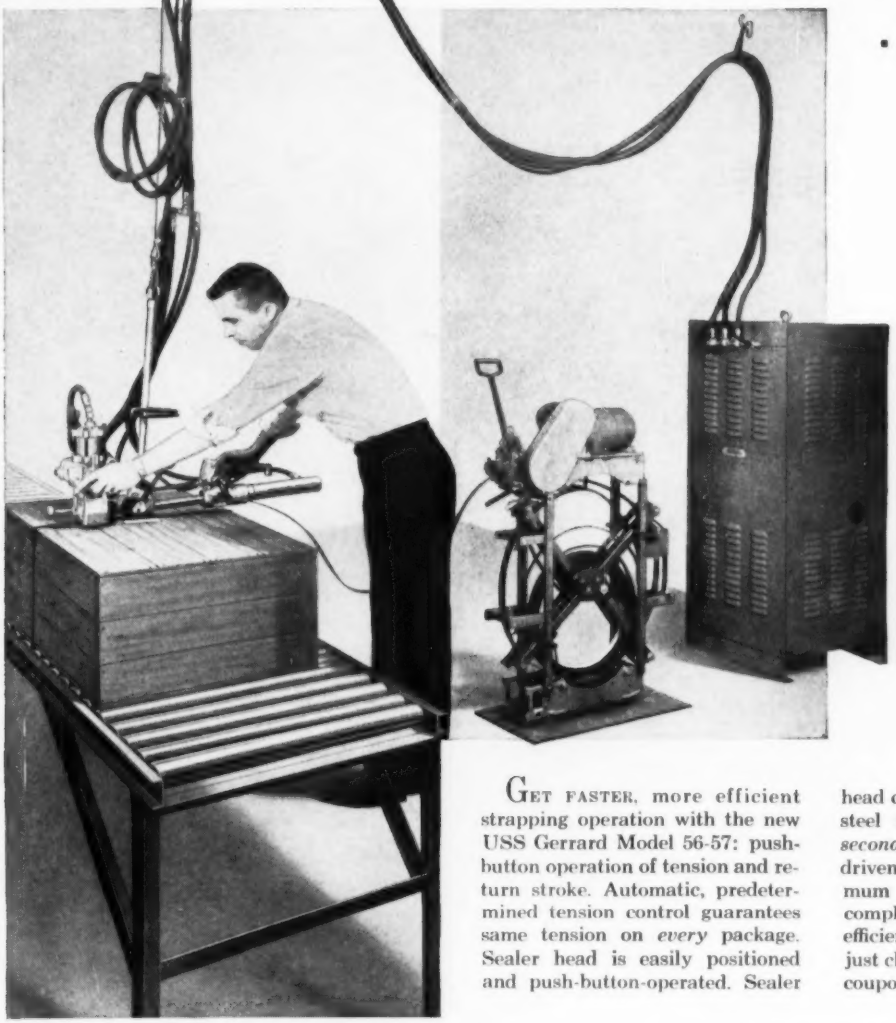
Positive, accurate loading, single point tooling and template control mean fewer headaches and larger profits on your lathe work. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



New Britain +GF+ Copying Lathe

NEW!

USS GERRARD Hydraulic-Powered Sealer-Stretcher Combination



...provides controlled tension— faster operation

GET FASTER, more efficient strapping operation with the new USS Gerrard Model 56-57: push-button operation of tension and return stroke. Automatic, predetermined tension control guarantees same tension on *every* package. Sealer head is easily positioned and push-button-operated. Sealer head converts from ¾" to 1¼" flat steel strapping in *less than 60 seconds.* Can be used with power-driven strap dispenser for maximum speed and efficiency. For complete information on the fast, efficient USS Gerrard Model 56-57, just clip out and send in the handy coupon, today.

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Please send me folder on the Hydraulic Sealer-Stretcher and the 36-page GERRARD Blue Book of Packaging. No obligation.

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Up to 40% higher tightening torques keep a

—and only the combination of an UNBRAKO screw

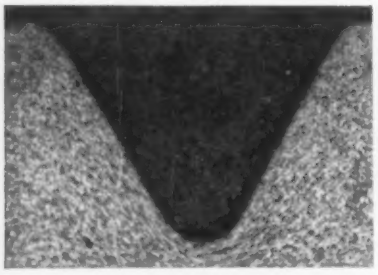
RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

The High-Torque UNBRAKO socket set screw is made to withstand the highest tightening torques ever used to seat a set screw—up to 40% higher than an ordinary set screw. But to take full advantage of this UNBRAKO feature you must have a key that can apply the force required to seat it without damaging the screw or snapping the key. The High-Titan UNBRAKO hex key is designed specifically to set a High-Torque UNBRAKO so that you can be assured of full *high-torque* performance every time.

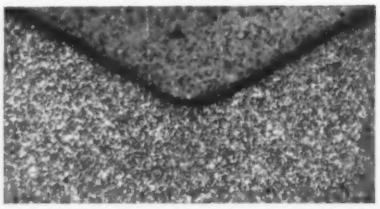
Here's why a High-Torque UNBRAKO can be seated tighter—and stay put

UNBRAKO SET SCREW



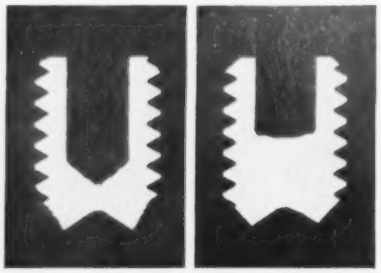
It has fully formed threads that make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010 in. below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



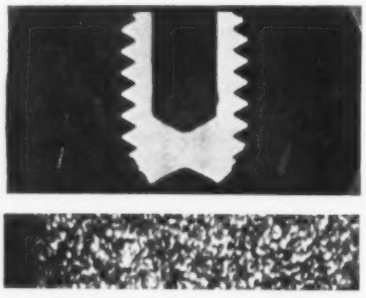
The High-Torque UNBRAKO has a radius in the socket corners. This eliminates the sharp corners where cracks start. It also distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower torques than those recommended for UNBRAKO.

UNBRAKO SET SCREW **ORDINARY SET SCREW**



The High-Torque UNBRAKO has a deeper socket, which gives you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

UNBRAKO SET SCREW

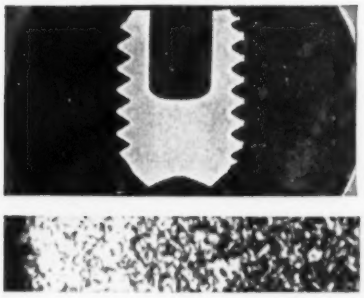


The High-Torque UNBRAKO is properly heat treated, kept clean. Its grain structure is uniform. It is free of decarburization. There's no danger of stripping the threads or shearing the point when tightening

High-Torque UNBRAKO socket set screw tight

and key assures full *high-torque* performance

ORDINARY SET SCREW



torques are applied. The ordinary screw is suffering from an overdose of decarburization; socket walls, threads and point are full of the telltale white spots that identify it.

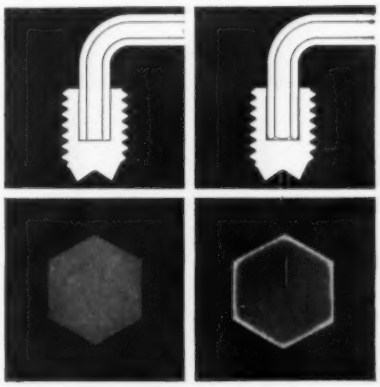
And here's why an UNBRAKO High-Titan hex key can be used to apply far more tightening torque to a High-Torque UNBRAKO socket set screw than is needed without damaging either the screw or the key.

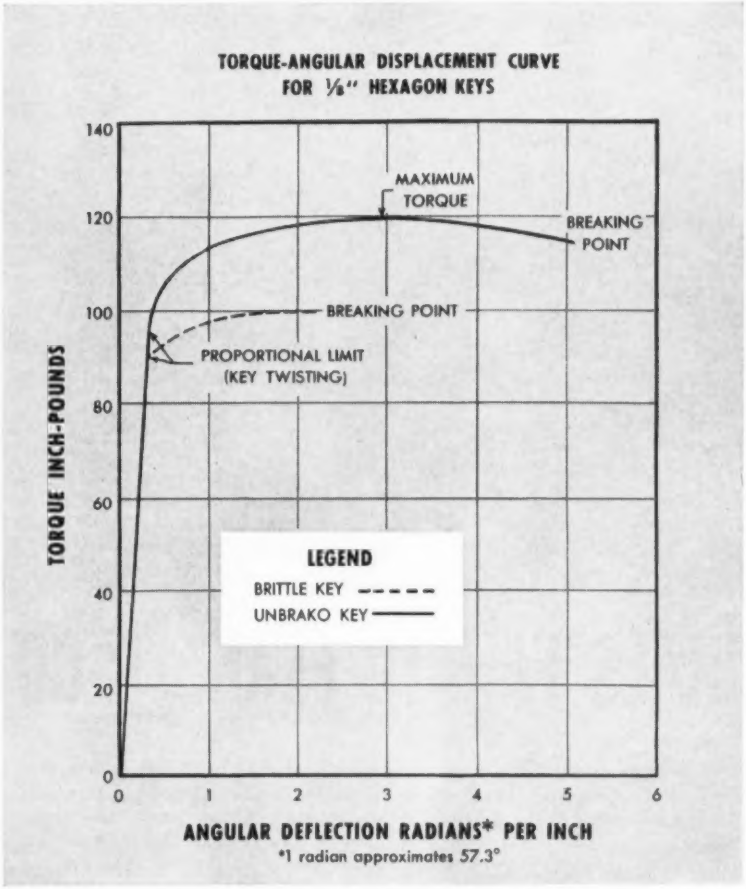
The High-Titan UNBRAKO is not an ordinary hex key. It is a precision internal wrenching tool with high ductility, specially designed to assure full high-torque performance. It is made of special alloy steel bar stock, inspected magnetically and chemically to make sure that the material is flawless and of the specified properties.

Its sides are flat and parallel. The corners, which exert torque on the inner walls of the socket, are sharp and tough. The bend is strong.

The High-Titan UNBRAKO is accurately sized across the flats and across the corners to insure snug fit and full wall contact. It won't ream or wear an UNBRAKO socket. The square cut end engages the full depth of the socket for greater tightening power. It gives you up to 25% more wrench engagement than a key with a chamfered end.

UNBRAKO KEY **CHAMFERED END KEY**





The High-Titan UNBRAKO hex key is heat treated in modern atmosphere-controlled furnaces. The surface is casehardened without decarburization. The extra hard surface gives the key longer life. And it retains its dimensional accuracy, is tougher and more ductile than ordinary keys. This torque-angular displacement curve for ⅛ in. hexagon keys distinguishes a High-Titan UNBRAKO from an ordinary key. The High-Titan UNBRAKO has a higher yield point and a higher breaking point—you can exert a much higher torque with it without snapping the key.

Be sure you get the full high-torque performance offered only by the combination of a High-Torque UNBRAKO socket set screw and a High-Titan UNBRAKO hex key. Both products are stocked by authorized industrial distributors. Ask the one nearest you for complete information. Or write STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

Unbrako Socket Screw Division **SPS** **Jenkintown, Pennsylvania**

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CHICAGO CARDINALS FAIL TO FLAKE TI-CO®

Hard to believe. But not a chip, not a flake in TI-CO's coating— even at edges of deepest dents.

First-string linesmen Stonesifer, Dahms, Dittrich, Simmons, Hogland, Jennings and Nagler—nearly a ton of hard-hitting pro footballers—gave it everything they had, and still couldn't flake TI-CO.

Dent it? Sure. They dented quite a few opponents during the past season, too. But not a crack, chip, or trace of peeling or flaking could be found on this sheet of TI-CO, even after shoe cleats, backed with all that muscle, pounded it unmercifully.

Most TI-CO users don't wear cleats, but even the toughest, roughest handling or fabrication won't flake TI-CO's protective zinc coating. And that means absolutely dependable corrosion resistance.

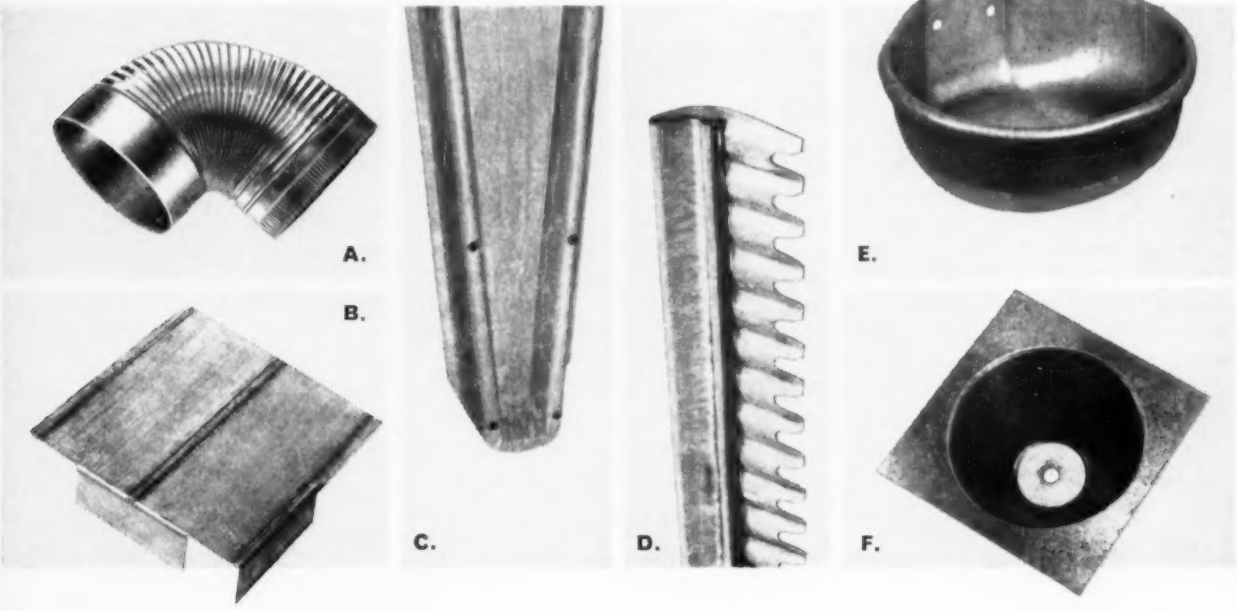
No forming operations too tough for Inland TI-CO galvanized sheets

If your products require deep-drawing, roll-forming, Pittsburgh lock-seaming, spin-drawing, crimping, perforating, or any other difficult fabricating process, you can make them with TI-CO and have the added advantage of over-all corrosion resistance. If you're presently using conventional pot galvanized, you can save money by switching to TI-CO. That's because TI-CO galvanized sheets, made by the patented Sendzimir process, take the most severe forming in stride, without flaking or peeling of the zinc coating. Rust doesn't have a chance to get a foothold. Unlike products made from conventional pot galvanized steel sheets, those made with TI-CO do not require re-dipping or "touch-ups" after fabricating, and rejects are greatly reduced. And TI-CO costs no more.

Non-flaking Inland TI-CO galvanized sheets are making possible many new products and helping to reduce production costs on old ones. It will pay you to investigate the possibilities for TI-CO in your operation.

TI-CO GALVANIZED SHEETS ARE NOW READILY AVAILABLE!

The terrific demand for this high quality sheet has kept TI-CO in short supply since its development. Now, additional production facilities have been completed making greater quantities available.



A. Crimping on ductwork elbow. **B.** Pittsburgh lock-seams hammered tight. **C.** Roll-forming and crimping. **D.** Stamping and brake forming. **E.** Deep drawing and punching. **F.** Spin drawing. No matter how severe the operation, TI-CO galvanized sheets take it . . . and the zinc coating stays put!

TI-CO is available in cut sheets or coils, in gages 8 to 30 inclusive and widths as great as 60 inches. TI-CO comes with dry, oiled or chemically treated surfaces. Consult your local steel distributor or your Inland representative for your requirements.

INLAND STEEL COMPANY

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INLAND TI-CO

Look for this brand—
your assurance of
non-flaking performance

KENNAMETAL* Tooling *plus* Tool Engineering Service Tripled Return on Tooling Dollars

It doesn't show in the picture—but the Kendex tooling illustrated is producing THREE TIMES more parts per tool dollar than the clamped tools previously used. For Proof—see Case I below.

In many cases, results like these can't be obtained by "off the shelf" tools and "off the cuff" methods. Today's many new alloys and multitude of operations call for (1) scientific job analysis, to determine proper setups, speeds, feeds, and cuts, (2) scientific tool selection which may call for special tools for complex operations, and (3) machinist cooperation, to assure correct procedure. Kennametal's experienced Tool Engineers will work with your tool engineers and operating men in getting the right tool on each job. If standard Kennametal tooling does not cover the job . . . your Kennametal representative can make proper recommendations as all Kennametal field men are specially-trained tool engineers. For more information . . . just write to KENNAMETAL INC., Latrobe, Penna., Department KE.

*Trademark

C-3077

CASE I

Job illustrated above is profiling motor shafts of SAE 1045 and 4150; Brinell 200-300; length, 24" to 96". When clamped tools with various carbides were used, costs averaged $311 per month for 18 months' continuous production. Kendex tools with Kennametal Grade K21 throw-away inserts, in the first half-year period, cut the cost to $102.70 per month. (For detailed data, ask for Performance Report No. 540.)

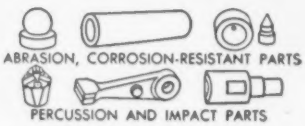
CASE II

In a production run turning countershaft pinions, SAE 4140; Brinell 212; length 4½"; Kendex tooling with the same K21 grade of insert cut tool cost to one-seventh that of previously-used insert tools. (Details—Performance Report No. 533.)

CASE III

In turning alloy steel rotor shafts, 34 to 36 Rockwell C, tool cost per piece was reduced from $.041 to $.022 when brazed tools were replaced with Kendex Roller Turner and Grade K21 inserts. Added savings came from higher speeds and less downtime. (Performance Report No. 537.)

INDUSTRY AND KENNAMETAL ...Partners in Progress



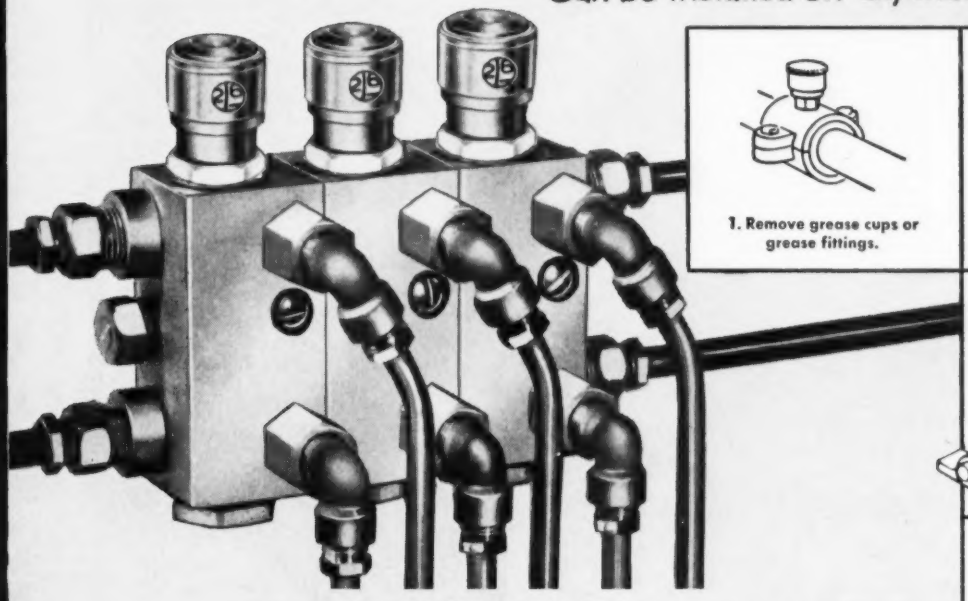
FASTER... FOOLPROOF... LESS COSTLY!

Meet toughest lubrication requirements

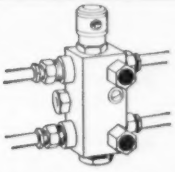
with this centralized

ALEMITE ACCUMATIC SYSTEM

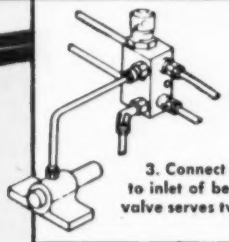
Can be installed on any machine in 4 easy steps!



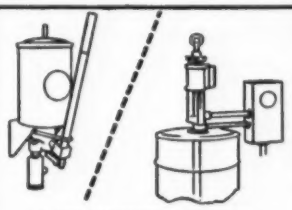
1. Remove grease cups or grease fittings.



2. Connect each valve in system to its two lubricant supply lines.



3. Connect valve outlets to inlet of bearings. (Each valve serves two bearings.)



4. Provide central pump for supplying lubricant to system.

Type II Accumatic Valve

Handles difficult multiple-bearing lubrication under all conditions. Fully sealed for clean lubrication of power shovels, cement kilns, conveyors—any outdoor or indoor installation. Operates whether completely immersed in fluid . . . covered by dirt or grit . . . or protected by anti-corrosive paint. For fluid oil or light grease. Four sizes, delivering from .050 to .500 cu. in. of lubricant.

Fully hydraulic—no springs to adjust or replace.

Now available with Lubrication Recording Cycle Counter—for a fully automatic record of bearing lubrication!

Tests show no appreciable variation in the amount of lubricant discharged after 73,312 cycles—equal to *122 years of twice-a-day service!*

ALEMITE ACCUMATIC ADVANTAGES!

- Prevents application of wrong lubricant.
- Seals completely against damaging dirt, grit and water.
- No parts are neglected—lubricates inaccessible and dangerous bearings at regular intervals.
- Eliminates product spoilage due to over-lubrication.
- Eliminates point-by-point lubrication methods—services all bearings in one operation.
- Delivers exact amount of lubricant to bearing.

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for BEST results in surface grinding...

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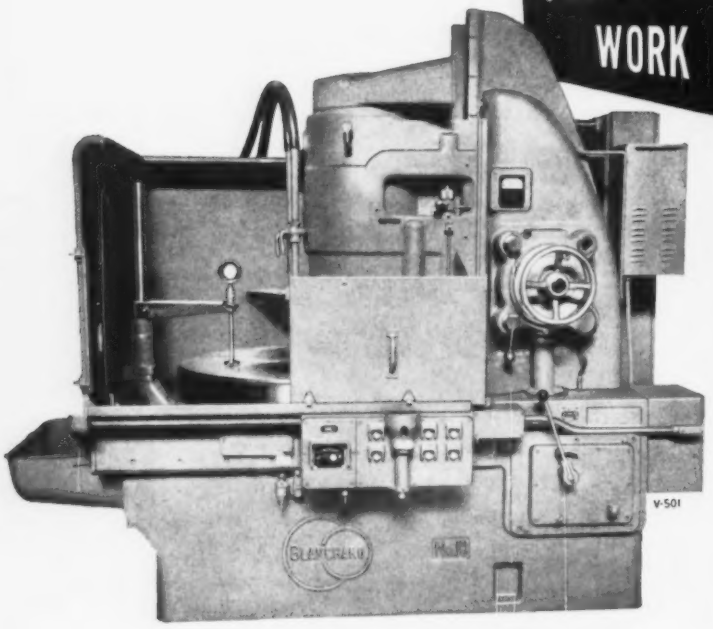
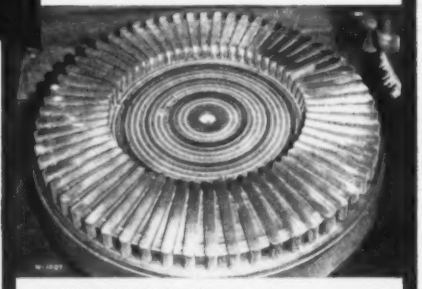


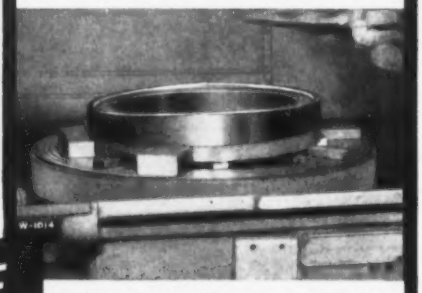
PRODUCTION WORK

SIDE PLATES. 9" x 18" plates ground from rough on No. 18 Blanchard with 36" chuck. Stock removal 1/16" to 1/8" per side. Held flat within .003", parallel to .001", and to dimension tolerance of ± .001". Production: 30 surfaces per hour.

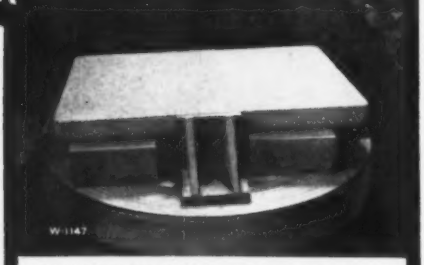


CONNECTING LEVERS. Cast iron levers ground in special magnetic fixture with pins located in "vee's". Stock removal per side is 1/32" to 1/16"; must be flat and at right angles to pins. No. 18 production: 180 pieces per hour, compared to 20 pieces per hour by former method used.

MAINTENANCE AND ODD LOT WORK



HARDENED STEEL PUNCHES. This 21-13/16" dia. punch, reground on a No. 18, is centered radially on 36" magnetic chuck. Duplicate circumferential and radial shear reliefs are generated with two setups.



GRANITE SURFACE PLATES. A No. 18 Blanchard reconditions this 18" x 34" granite surface plate by grinding it flat within .0002". 3/16" of stock is removed in 5 hours.

Blanchard Grinders are used throughout industry on surface grinding jobs that demand the utmost in production, finish and accuracy.

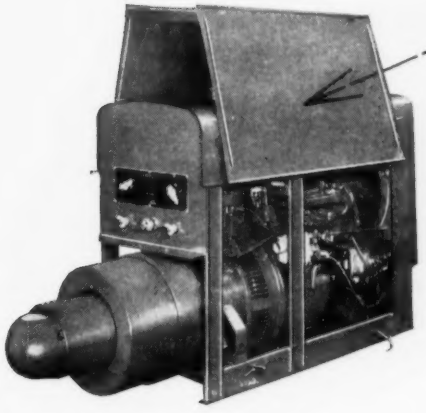
Whatever *you're* surface grinding, there's a Blanchard designed to do the job speedily and accurately.

PUT IT ON THE **BLANCHARD**

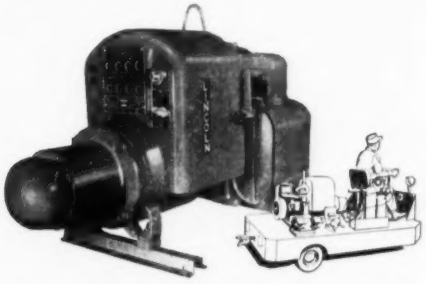
Send for free copies of "Work done on the Blanchard", fifth edition, and "The Art of Blanchard Surface Grinding".

THE BLANCHARD MACHINE COMPANY
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

Mobile maintenance shop has ready-to-use power



Lincoln 200 amp. *"Shield-Arc" Engine-Driven welder. Furnishes 115 volt DC auxiliary power for lights, tools, etc. Write for Bulletin SB-1337.*



Weldanpower—*Compact, lightweight Engine-Driven combination welder and power plant furnishes 200 amps. AC welding current and 115/230 volt AC, 60 cycle power—at the same time if necessary. Write for Bulletin SB-1339.*

There's no lost motion—no waiting for electricians, for special wiring or hook-ups when your maintenance man takes the power he needs to the job. Repairs can be started seconds after your maintenance man arrives on the scene.

Ready-to-use power in the form of a Lincoln Engine-Driven welder mounted on a gasoline powered truck saves as much as 125 man hours per month for one manufacturer. Auxiliary power, standard on all Lincoln Engine-Driven welders, operates tools and lights, and 200 amp. welding current handles welding jobs with ease.

Mobile maintenance shops with Lincoln Engine-Driven welders are saving money for others. Why don't you investigate today?

THE LINCOLN ELECTRIC COMPANY
Dept. 1533 • Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment

When a Lincoln Engine-Driven Welder **Has** Auxiliary Power for Lights and Tools **Yet** can be easily moved from job to job

WHY don't you use a mobile maintenance shop and save money?

. . . lets one man handle work you'd pay a crew to do!

By putting new efficiency, safety and positive control into the hands of Towmotor lift truck operators you enable them to do a *bigger day's work, easier.* You let each one handle jobs you'd normally hire a *gang* to do.

Through modern Towmotor mass-handling each operator has the power to improve your profit picture, because the new Towmotor fork lift trucks multiply their productivity. Look over the new features that operators like best about our latest models—such as:

- New planned-comfort design
- Off-center adjustable seating
- Double action hydraulic tilt
- Newly-improved power steering
- "3-second access" to engine
- Famed 12" reach for all controls

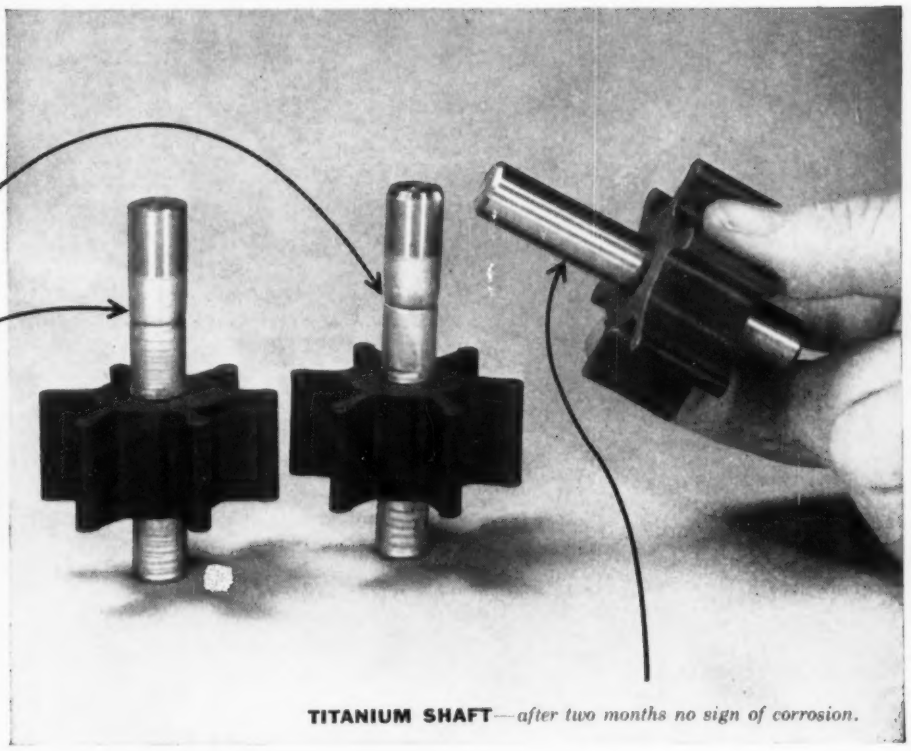
Before you decide on your next fork lift truck, we urge you to get all the facts on the newly-designed Towmotor units. Write to Towmotor Corporation, Cleveland 10, Ohio today and ask for our new illustrated lift truck booklet—No. SP-23.

Leaders for 38 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR ® THE ONE-MAN-GANG — GERLINGER

Gerlinger Carrier Company, Dallas, Oregon, is a subsidiary of Towmotor Corporation

Progress with **TITANIUM**



SHAFTS WHICH FAILED AFTER 45 MINUTES. *Both are made of premium metals, one ferrous, one non-ferrous.*

TITANIUM SHAFT—*after two months no sign of corrosion.*

TITANIUM PUMP SHAFT LASTS

...where other metals corroded in 45 minutes

The problem was to pump ferric chloride, an acid used in etching printed circuits in electronics manufacturing. Jabsco Pump Company, of Burbank, California, sought to develop a pump to handle this highly corrosive acid, and replace batch handling.

Premium metals were tried for the pump shaft (the impeller is neoprene and the casing is plastic), but corrosion around the seal almost immediately led to leakage and failure. A glass shaft did not have sufficient strength. Then, using Mallory-Sharon commercially pure titanium for the shaft, the problem was solved—permanently. Titanium has outstanding resistance to chlorides.

The cost figures here are illuminating. The pump with the titanium shaft cost about double the pump with the ferrous metal shaft . . . and about the same as the pump with the other non-ferrous metal shaft (because of machining difficulty with the latter). So first cost of titanium is lower than you may think. And titanium paid for itself in *90 minutes.*

Let us help you apply titanium to your corrosion problems . . . our service engineering group will be glad to assist. For information, write Dept. R-10.

TYPICAL PRESENT APPLICATIONS OF TITANIUM

Anodizing racks	Impellers
Condenser inserts	Piping
Filters	Process vessels
Heat exchangers	Steam jet diffusers

MALLORY Ti SHARON

MALLORY-SHARON TITANIUM CORPORATION · NILES, OHIO

Producers of titanium and titanium alloy sheet, strip, plate, rod, bar, billets

Kaiser Aluminum ingots being prepared for "homogenizing" in Gas-fired furnaces prior to extrusion into aircraft parts

GAS assures

precision alloy extrusions at Kaiser Aluminum

Gas plays a major role in the development of precision quality alloy extrusions for aircraft at the U. S. Air Force Heavy Press Plant operated by Kaiser Aluminum at Halethorpe, Maryland.

With Gas, uniform temperature and controlled atmosphere keep molten aluminum flowing smoothly into casting equipment. The metal is cast into logs about 12 to 26 inches thick and 25 feet long. Gas-fired furnaces heat the logs to 1000° F and hold this temperature about 24 hours to homogenize the metal prior to extrusion. The long logs are cut into 58 inch billets, placed on the press and extruded into various shapes.

Again, Gas is used to heat the extruded shapes in a controlled atmosphere to impart the desired physical qualities in the alloys used. As in the melting process, Gas provides precise temperature control and close control of atmosphere within the furnace.

For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results Gas and modern Gas equipment provide. *American Gas Association.*

How do you keep rocketing at 8000 mph?

Courtesy: Resistoflex Corp., Roseland, N. J.

For one thing, you feed your rocket fuel – savagely corrosive stuff, like white and red fuming nitric acid. You use a fuel line of Teflon hose, wrapped in stainless wire braid – with special stainless steel fittings to make it stay put.

The fittings are swaged on – and listen to a few of the 19 test beatings they get. In an impulse test, with fluid temperature at 400° F., an impact of 4500 psi is applied, and reduced to zero in one second. The cycle is repeated 35 times a minute – for 100,000 cycles.

Another test, at 450° F., submits the hose and fittings to vibration at 2000 cycles per minute through ¾" lateral movement. This grueling test is applied for 200 hours . . . is followed by a severe high-pressure test to assure a leak-proof seal. It's hard on the fittings . . . but a positive test of durability.

Frasse has provided trouble-free stainless steel for this vital fitting application since its inception – and often supplied it *in hours*, to meet production deadlines. So, if you want reliability in your product, and a reliable source of supply . . . rely on Frasse for *all* your stainless requirements. It's a habit you'll find profitable.

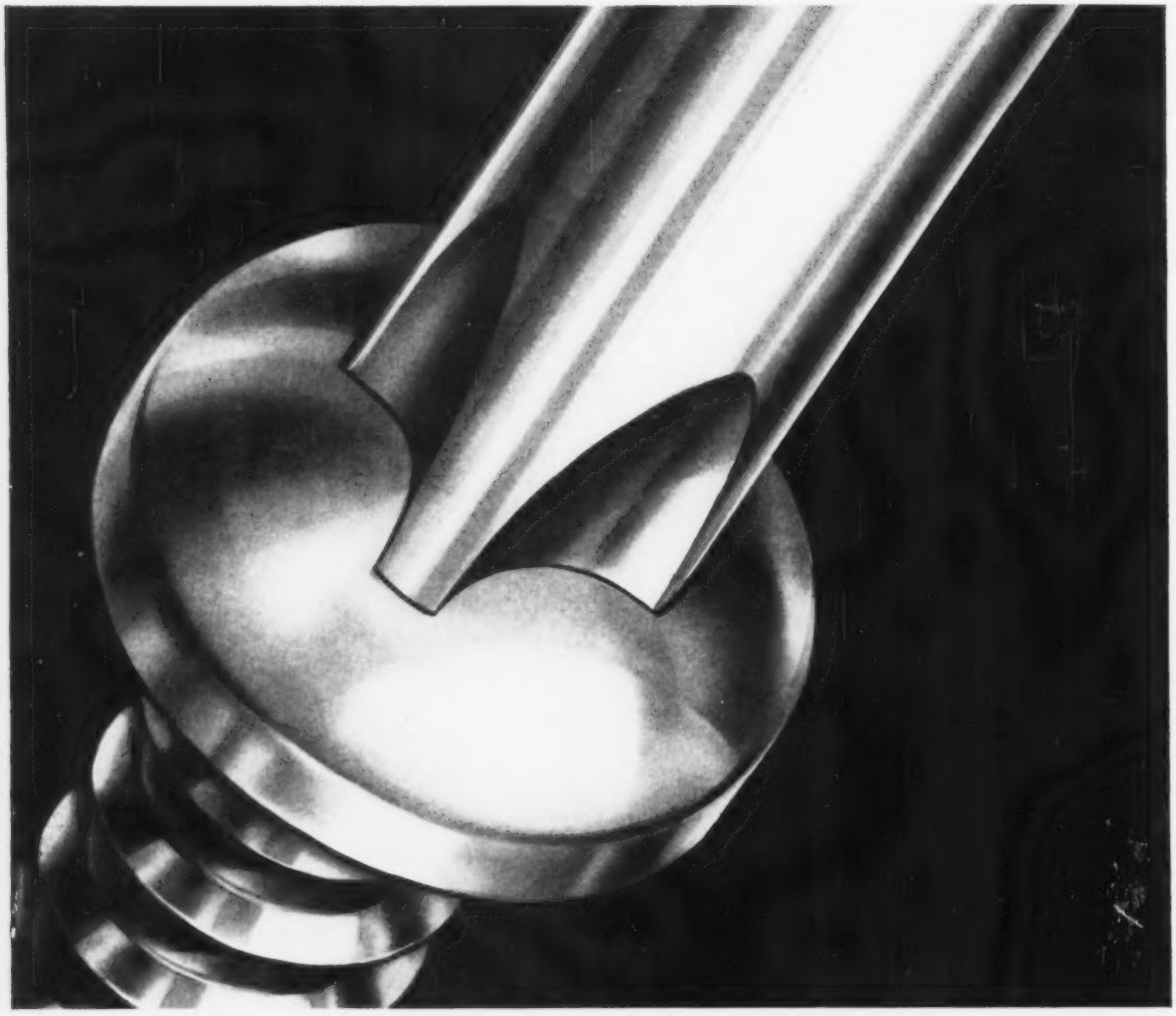
Call FRASSE for COMPLETE STAINLESS STEEL SERVICE

Bars • Forgings • Sheets • Strip • Plates • Wire • Tubing • Pipe • Fittings • Valves

Peter A. Frasse & Co., Inc.

NEW YORK 13, N. Y.	PHILADELPHIA 29, PA.	BUFFALO 7, N. Y.	SYRACUSE 1, N. Y.	HARTFORD 1, CONN.
17 Grand St.	3911 Wissahickon Ave.	P.O. Box K, Sta. B	P.O. Box 1267	P.O. Box 1949
WAlker 5-2200	BAldwin 9-9900	BEdford 4700	HOward 3-8655	JAckson 9-6861

LYNDHURST • BALTIMORE • ROCHESTER



For service personalized to your need...

AMERICAN is the name!

For companies big or small, American *is* the name for fasteners because we're flexible enough to set up any service schedule that fits *your* need.

This interest in *your* needs is one of the four factors that make American the biggest bargain in fasteners . . . in price, service, quality and research.

American Gives You More of All Four

In quality, which goes far beyond the product inspection for dimensional and physical characteristics to include 30-minute checks on key processes to insure exactness.

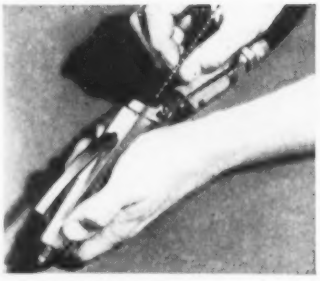
In research, that developed the original Phillips fastener, making possible new, important cost savings in assembly and tooling.

In service, where American production facilities are keyed to your most demanding production schedules, supported by substantial inventories in key locations.

You may find local price differentials from time to time, but nowhere will you get more of all four than from American.

If this sounds unique in the industry, it is.

Make your own comparisons: send us your inquiry for price and delivery or your specifications for special fasteners. And be sure to ask for American's Stock List.

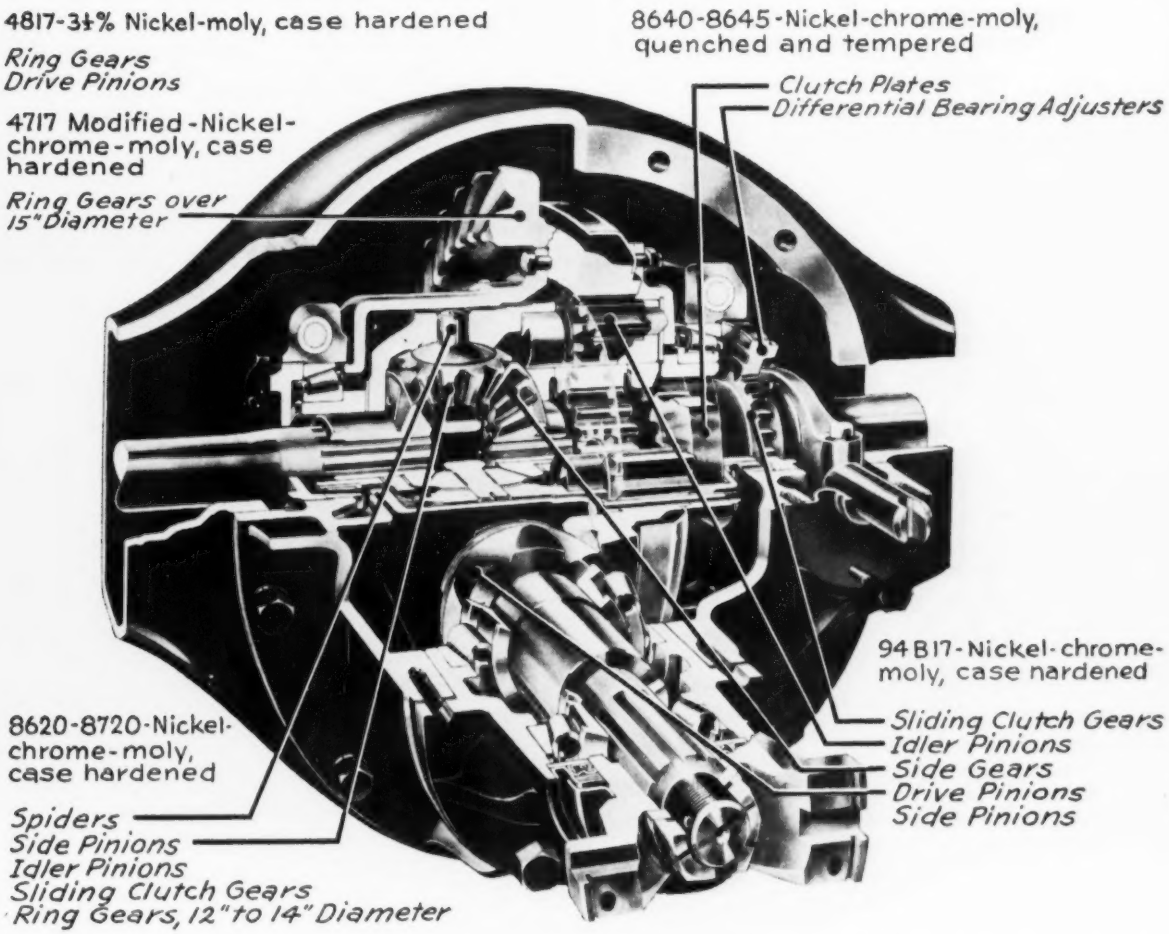


SCREWSTICK, another American development, enables power driving to replace individual handling of hard-to-manage small screws with a cost saving of 4 to 1.

AMERICAN SCREW COMPANY
Willimantic, Conn.
Chicago, Ill. • Detroit, Mich.

American!

Where seven Nickel Alloy Steels improve durability in heavy-duty axle mechanisms



This axle assembly illustrates how one designer – Eaton Manufacturing Company, Cleveland – takes advantage of the versatility of Nickel Alloy Steels to improve the durability of heavy-duty mechanisms.

The 3½% nickel-moly steel provides drive pinions with stamina needed to cushion shock and take high tooth pressure.

The nickel-chrome-moly carburized steels provide gears with a strong, tough core . . . a hard, wear resistant surface.

The Ni-Cr-Mo through hardened steels assure parts with good strength plus moderate wear resistance.

It's this high degree of selectivity found in Nickel Alloy Steels that makes it possible for designers at Eaton to choose just the right alloy steel for a part.

And, as you know, the *right* alloy steel in the *right* place pays off with maximum durability at lowest ultimate cost.

When it comes to the question of *selecting* a steel for any engineering application Inco offers comprehensive assistance. All the help . . . all the information you need is yours for the asking.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **INCO NICKEL**

Steel that goes into this bumper, being installed on one of America's fine cars, is ordered and tested to rigid specifications. The steel must be exceptionally clean, bright, flat, and with no surface defects. It must have close chemical analysis and internal quality so it will draw deeply without "orange peel." The company installing this bumper is so careful that in the last ½ million bumpers it has scrapped only ½ of 1% due to metal failure! Pittsburgh Steel's sheet constantly meets these exacting specifications.

Pittsburgh Steel's quality standards pay off as automakers in a highly competitive market demand...

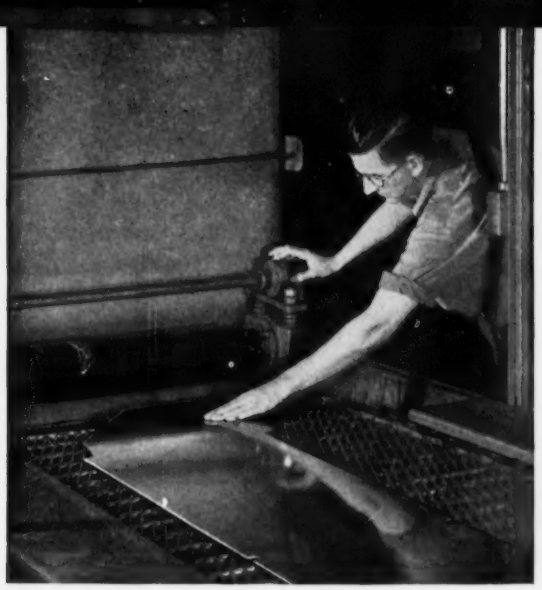
Better Sheet Steel For Making Bumpers

Today, the makers of America's better cars are more than just critical when they specify steel for making bumpers. They realize that the broad and complex chromed areas front and back on their models must enhance the appearance of the cars if they expect to beat competition in today's tight market. They demand the best, and then test exhaustively against strict specifications to make sure they get it.

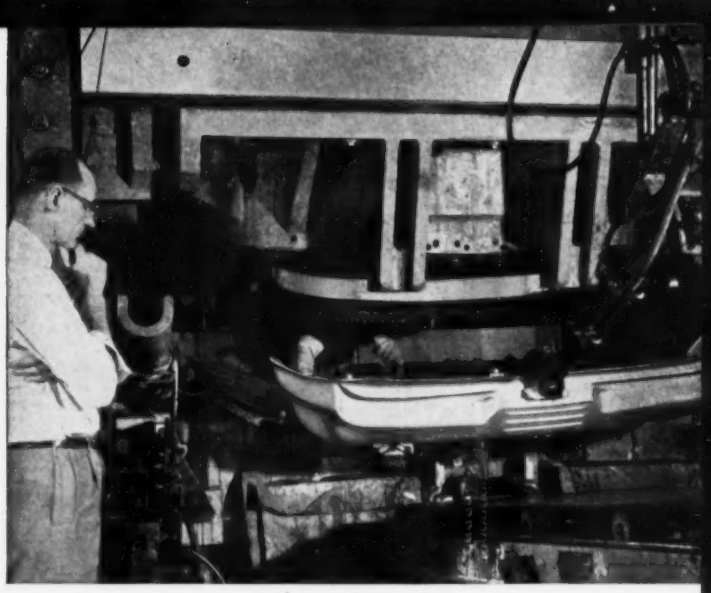
That's where Pittsburgh Steel Company shines. With its outstanding new cold rolling facilities backed up with the latest technology, it daily produces sheet for a variety of the toughest applications. When an automaker says of its bumper stock that yield must be held to 30-33,000 psi, and elongation must be 38% before failure—that's duck soup for Pittsburgh Steel. Orders like this come from one company that prides itself on less than one-half of one percent of scrap due to metal failure in the last half-million bumpers!

One bumper plant inspector put it this way: "We have to be especially careful to watch steel quality because, although the draw isn't unusually deep on wrap-around bumpers, it is very critical since it involves complex bends up to 120°. And even the tiniest stretcher-strain marks or other defects would show up like a sore thumb under the bright chrome finish."

If Pittsburgh Steel's sheets can meet standards as high as these, they can help you solve your forming problems, no matter how tough they may be. When you buy from Pittsburgh Steel you can always be sure you are getting sheet that has:



Grinding provides a surface finish which must not deviate more than 10 micro inches and since rarely more than 2% is taken off, the original sheet surface had to be excellent.



The draw of this massive press is critical since complex angles up to 120° must be achieved without steel failure. Sheet steel supplied by Pittsburgh Steel Company has excellent formability which stems from good internal quality.

After all drawing and stamping operations are complete, each bumper is carefully inspected before going to the plating line.

Each bumper gets a last close look after plating. The bright finish magnifies any defects so the surface must be perfect.

- **Superior Internal Quality**—proper uniform grain structure free from flaws and subsurface imperfections.
- **Good Surface**—clean, bright and smooth—free from scratches, pits and slivers.
- **Flat and Uniform**—consistent from sheet to sheet to save you scrap.
- **Formability**—excellent capacity to withstand deep drawing.

There is an experienced Pittsburgh Steel Company sales engineer as close to you as your telephone. He is at your service—eager to help you solve your toughest sheet problems.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

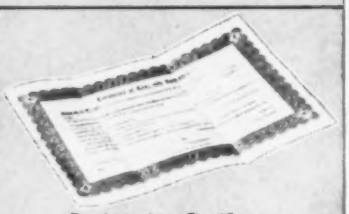
District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

Accoloy X-weld 125 Chain
Pat. No. 2763768

New Shaped Master Link

ACCO Registration Ring



Registration Certificate

Big, costly loads are safe with Acco Registered® Sling Chains

• Pictured above is a huge, 35,000-pound casting being lifted *easily and safely* by a 4-leg ACCO *Registered* Sling Chain. Directly beneath the load is a highly polished and machined crank shaft worth many thousands of dollars.

Imagine the cost in lost labor and materials, should the sling chain fail! But it won't fail—for this ACCO *Registered* Sling Chain and all its components have the inbuilt strength needed to handle the job with complete safety!

When you buy an ACCO *Registered* Sling Chain, you get these four exclusive "plus values" which *add materially to the worth, but not to the cost,* of the sling:

1 • **Accoloy X-weld 125 Chain**, for extra strength. This chain hangs straight . . . does not kink . . . has extra resistance to bending.

2 • **New Shaped Master Link**, uniquely shaped to withstand deformation under loads up to 18% greater than a round-section link can do.

3 • **ACCO Registration Ring**, serially numbered as evidence that the assembled sling has been factory proof-tested to twice its working load limit.

4 • **Registration Certificate**, signed by us, attesting to the field-tested design and proof-testing of the complete sling.

Remember, the best sling is one of your most economical material-handling tools. You'll find it good business to consult your ACCO *Registered* Sling Chain Distributor on all your sling needs; his counsel is available without obligation. If you don't know his name, write us at York, Pa.

WHAT "ACCO REGISTERED" MEANS

1 The best material
2 Unit safety factor (on bodies, rings, links, hooks)
3 Proof test of complete sling to twice the working load limit
4 Actual field service test of each design
5 Metal identification ring on each sling
6 Signed Registry Certificate with each sling

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

*Indicates Warehouse Stocks

ACCO
TRADE MARK

500 Stock Sizes of Ledaloyl Self-Lubricating Bearings

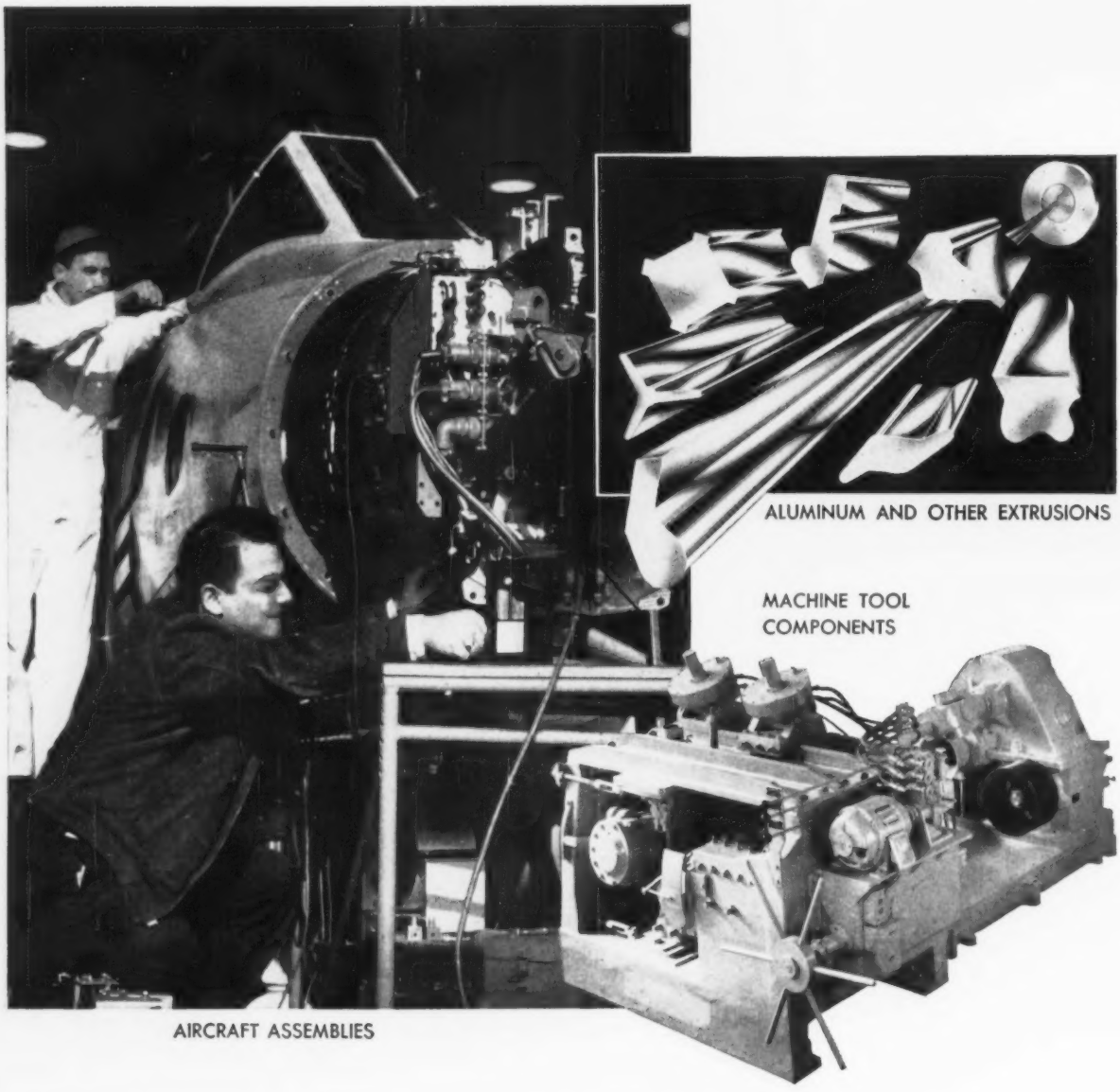
With stock Ledaloyl self-lubricating bearings you can enjoy the advantages of economy and quick delivery and still have a wide latitude in design. Plain cylindrical, flanged and spherical self-aligning types are available with various ID's, OD's and lengths. Engineers find that in many applications the standard composition and size tolerances are ideal for their products.

Johnson stock Ledaloyl bearings will function efficiently in hundreds of different applications. Oil is retained in the pores of the bearing and metered out to the shaft when it is in motion, eliminating the need for an expensive and bulky lubricating system. In many cases the bearing will provide adequate lubrication for the life of the product without adding to the original oil content.

If you are interested in obtaining complete details on the advantages of stock Ledaloyl self-lubricating bearings or any of the many other types of Johnson sleeve bearings consult your Johnson distributor or write for our catalog.

Johnson Bronze

505 South Mill Street, New Castle, Pa.



ALUMINUM AND OTHER EXTRUSIONS

MACHINE TOOL COMPONENTS

AIRCRAFT ASSEMBLIES

Before they fly, shape, form... Columbia-Southern Trichlor cleans them

Different parts, assemblies, units have one common problem: effective, thorough cleaning at low unit cost. The increasingly popular answer in metals plants of all types . . . vapor degreasing with Columbia-Southern Trichlorethylene.

Modern work flow planning calls for more frequent cleaning of materials during processing. Chips, grinding and buffing compounds, graphite, grease, coolants, quenching and lubricating oils—thorough removal of contaminants like these between operations holds rejects down. Nothing removes residues like vapor degreasing with the *right* solvent.

Columbia-Southern Trichlor works better because of its exclusively developed neutral stabilizer. Users find that pH stays high for extremely long periods. There's less cleanout, much longer running time before fresh solvent is needed. Made to rigid standards of quality by one of the world's leading merchant producers of chlorine, Columbia-Southern Trichlor is uniformly pure, drum by drum and tank car by tank car.

Try this fine trichlorethylene and note the drop in rejects, whether you're cleaning steel, aluminum, magnesium or any other metal. Order today from the nearest Columbia-Southern District Sales Office or from your regular solvents distributor.

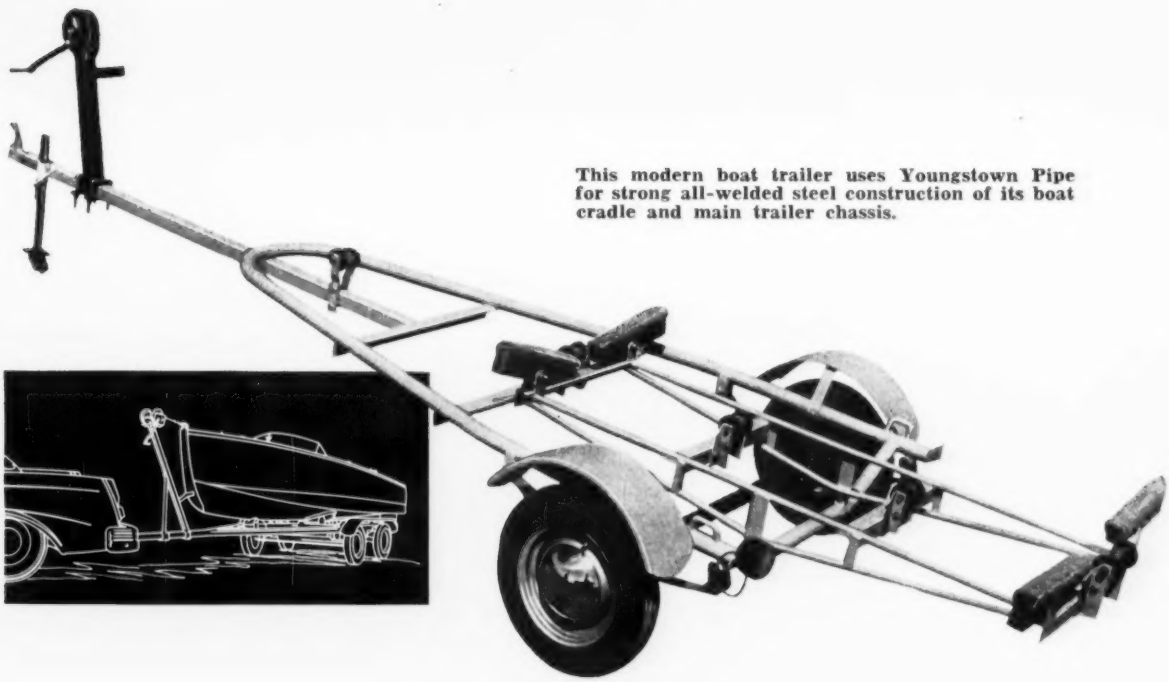
COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte Chicago • Cleveland • Boston • New York St. Louis • Minneapolis • New Orleans Dallas • Houston • Pittsburgh • Philadelphia San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division



This modern boat trailer uses Youngstown Pipe for strong all-welded steel construction of its boat cradle and main trailer chassis.

YOUNGSTOWN CONTINUOUS WELD PIPE

. . . provides extra-strength chassis for "Texan" boat trailers

Here's an unusual application for steel pipe. "Texan" Boat Trailers, produced by the Cunningham Trailer Works of Lubbock, Texas, are fabricated from Youngstown Pipe to provide users maximum cargo protection as well as greatest ease during loading, unloading and while making the haul.

In line with Cunningham's policy of using only the highest quality raw materials, they wisely specify Youngstown Continuous Weld Pipe for fabrication of both the boat cradle and main trailer chassis. This gives Texan boat trailers a sturdy welded steel construction able to withstand the most rugged use—on or off the highway. Why not use Youngstown Pipe structurally to build strength and quality into your products?

Your local Youngstown Distributor is the man to call when you want quality pipe—day or night. He has a complete stock and his on-the-spot fast delivery will help keep your operations humming along at top speed. Why not call him today?

Next time you need pipe—for any purpose—specify Youngstown and secure these 7 Points of uniform goodness

- uniform ductility
- uniform lengths
- uniform threading
- uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

In these modern annealing furnaces, a clean, dry nitrogen atmosphere assures clean, bright sheet. Annealing temperature is measured accurately with lead thermocouples for proper control of temperature of crystallization of the rolled metal structure and to insure meeting specified mechanical-property limits.

Anaconda Aluminum Coiled Sheet

ALUMINUM COILED SHEET produced to the high standards of quality and uniformity maintained by The American Brass Company is now available for prompt shipment from our Torrington Division to all points in the United States.

It is rolled on the most modern, high-speed equipment. X-ray controlled to close tolerance in gage. High-speed, electronically operated slitters give exact widths with clean edges on evenly and tightly wound coils. Latest annealing furnaces—with controlled atmosphere and temperature—provide high uniformity of metal structure to meet specified mechanical-property limits.

IN THESE WIDTHS: Maximum 28 inches
Minimum $\frac{3}{8}$ inch

IN THESE THICKNESSES: Maximum 0.064 inch
Minimum 0.006 inch

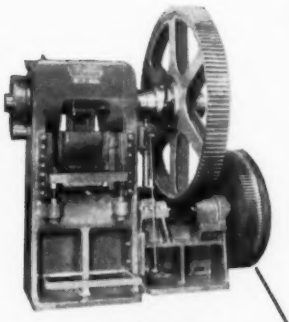
COIL WEIGHTS: Up to 100 lb. per inch of width
ARBOR SIZES: 4, 6, 8, 10, 12, 16, and 20 inches in diameter
ALLOYS: 1100, 3003, 3004, 5005, 5050, 5052
TEMPERS: Alloy Nos. 1100, 3003, 5005
–O, –H12, –H14, –H16, –H18
Alloy Nos. 3004, 5005, 5050, 5052
–O, –H32, –H34, –H36, –H38

FOR IMMEDIATE ACTION, call The American Brass Company Office nearest you. The American Brass Company, Waterbury 20, Conn.

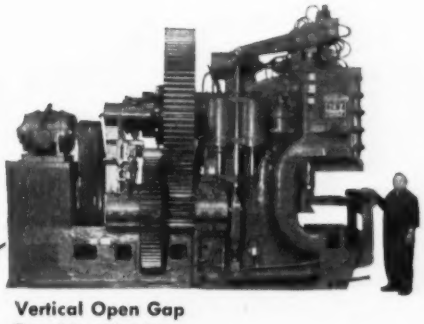
ANACONDA®
ALUMINUM COILED SHEET
Made by The American Brass Company

CLEVELAND
FABRICATING TOOLS

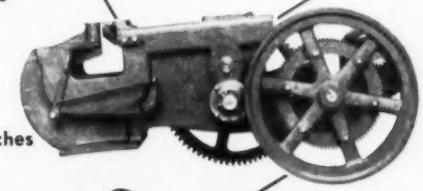
for Plate and Structural Steel



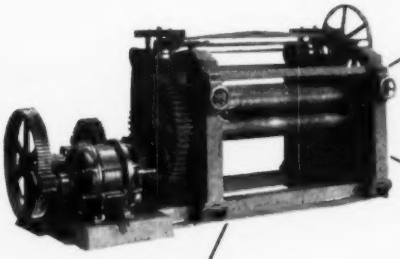
Bar Shears



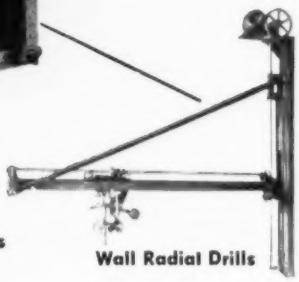
Vertical Open Gap Punching Machines



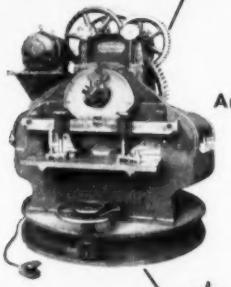
Horizontal Punches



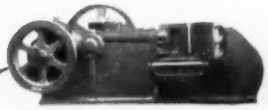
Straightening Rolls



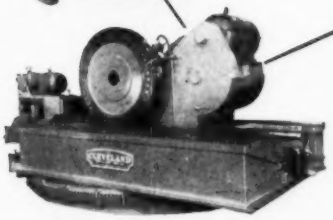
Wall Radial Drills



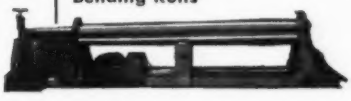
Angle Shears



Bending and Straightening Machines



Rotary Planers



Bending Rolls

Ruggedly built for profitable production and simplicity of operation, Cleveland Fabricating Tools are designed for trouble-free operation and years of service.

This dependable, economical performance of Cleveland Fabricating Tools is a proven fact with leading shipyards, bridge builders, railroads, structural steel shops and boiler makers.

Since 1880, Cleveland has engineered its complete line of tools to be the finest, most efficient for punching, shearing, bending, coping and notching bars, angles, plates, I-beams and other structural shapes. Write for Folder FT48 to help you determine the correct fabricating tool for your needs.

AA-6114

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

Offices
NEW YORK
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CHICAGO
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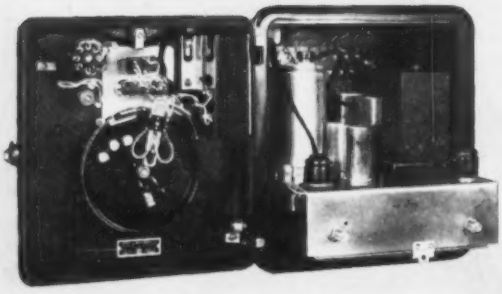
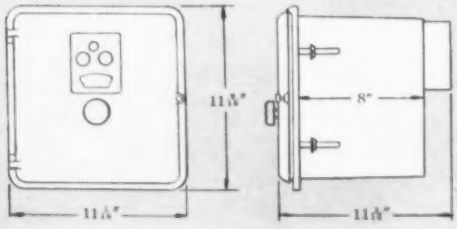


Design simplicity minimizes maintenance; sturdy components resist normal shock and vibration. Precisely calibrated slidewire and circuit resistors hold stability. For easy servicing, amplifier slides out of case; standard vacuum tubes are used . . . their replacement requires no special selection.



Compact Electromax controller mounts flush in panel. Leads are brought to terminal board located on back of case. Net weight about 27 pounds.

Thermocouple Electromax® Controller for temperatures up to 3200 F

- **0.3% LIMIT OF ERROR**
- **10 μV* CONTROL DEAD BAND**
- **CONTINUOUS STANDARDIZATION**
- **4-WEEK DELIVERY**

**0.5 F for base metal thermocouples; approximately 1.5 F for platinum thermocouples.*

Combining all the accuracy and reliability of a modified d-c potentiometer with a drift-free amplifier detector, this new Electromax signalling controller provides low-cost electronic two-position control where a record or continuous indication is not required. It's ideal for many electric and fuel-fired furnaces, ovens, plastic extruding machines, and some types of chemical processing units. Other uses include zone control on continuous ovens and kilns, and excess (overheat) temperature cutout control.

This compact signalling controller has only two moving parts—a plug-in relay and converter (chopper). These, together with simple circuitry and liberal use of plug-in components (including a plug-in amplifier), minimize maintenance and reduce initial cost. To speed start up of your process, Electromax is delivered four weeks after receipt of your order.

Other standard features include both thermocouple and amplifier fail-safe, and automatic reference junction compensation. Amber and red signal lights indicate whether process temperature is above or below set point.

For additional information on the thermocouple Electromax, call your nearest L&N office or write 4956 Stenton Ave., Philadelphia 44, Pa. Ask for Preliminary Data Sheet ND47-33(1).

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

NOTHING *can equal Stainless Steel*

in its unique combination of properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. For a reliable source of supply, United States Steel offers you the widest range of types, finishes and sizes.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

USS

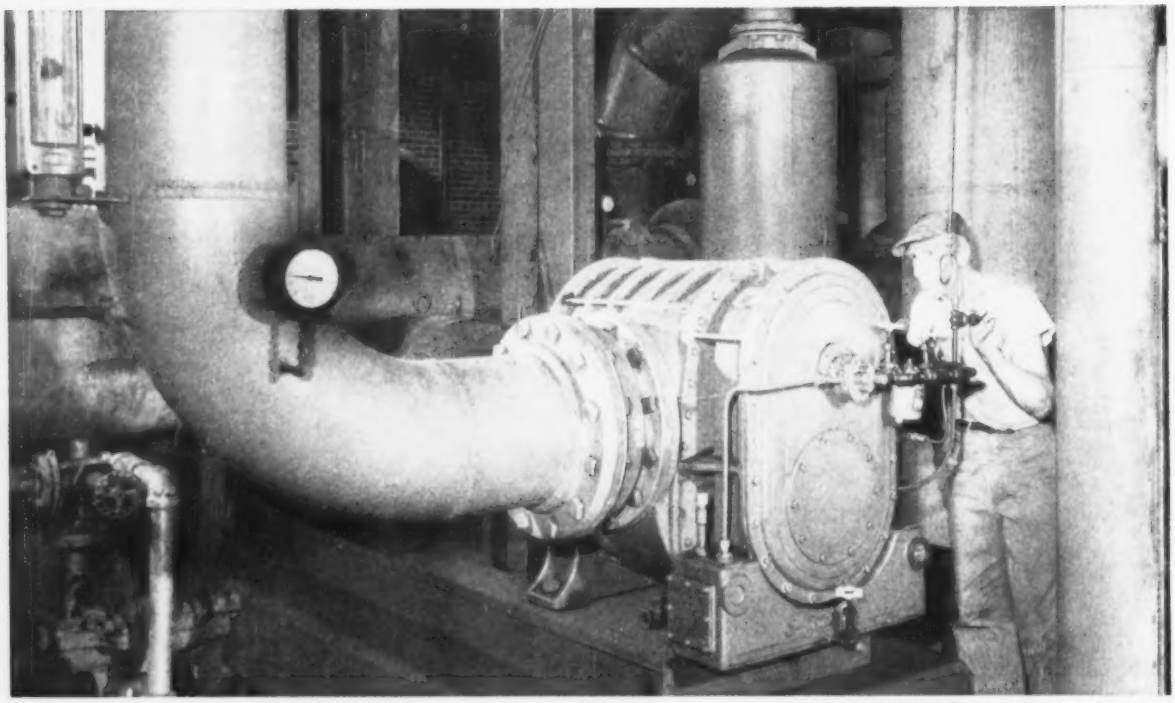
UNITED STATES STEEL

FOR HIGH TEMPERATURE STRENGTH. The Ryan Firebee is a pilotless jet airplane that flys about 600 mph at altitudes up to 40,000 feet. All three armed services are using it for target practice—to simulate attacking aircraft. Fuselage and turbojet engines use substantial quantities of Stainless Steel—mostly because of its excellent strength/density ratio at elevated temperatures.

FOR CORROSION RESISTANCE. If you're a photographer, you know that hypo is awfully corrosive. This print washer (it holds 75 8x10 prints in one loading) is made completely from Stainless Steel by the Arkay Corporation, in Milwaukee. For proof that Stainless is easy to fabricate, notice that the drum has 1,700 perforations, and double lockseam soldered joints are used throughout.

FOR TAKING A BEATING. These supermarket check-out counters are made from USS Stainless Steel. They withstand the pounding of heavy containers and are unaffected by corrosive meat and produce juices. It only takes 20 minutes for one girl to clean all eleven counters shown here. The Robert Becht Company of Cincinnati made them.

Most compact compressor of its type . . .

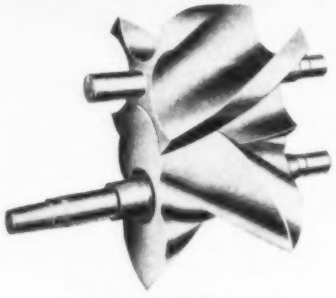


AXI-COMPRESSOR in an industrial plant

Use the

Axi-compressor*

for pressure and vacuum . . .
for air, gases, vapors



Rotors of Axi-Compressor

If you are looking for a compact, efficient source of pressure or vacuum, investigate AXI-COMPRESSORS: they provide greater output per pound of unit. AXI-COMPRESSORS may be operated efficiently over a wide range, with low power consumption.

Rotors are of cycloidal form, screw type. They operate with clearances of a few thousands of an inch, but never touch . . . there's no need for internal lubrication.

Operating advantages of this axial-flow, positive-displacement unit includes the following:

1. Compact, rugged construction
2. Smooth, shockless flow
3. No metal-to-metal contact in compression chamber
4. Operating speeds that permit direct-connected drivers in many cases
5. Oil-free delivery
6. Good efficiency over wide range

For complete information on the AXI-COMPRESSOR line for pressures from 25-inch vacuum to 15 psi, capacities from 100 cfm to 15,000 cfm . . . contact your Ingersoll-Rand compressor specialist. Performance curves available in Bulletin 11,001 . . . write for it.

*Axi-compressor
. . . formerly "Standardaire"

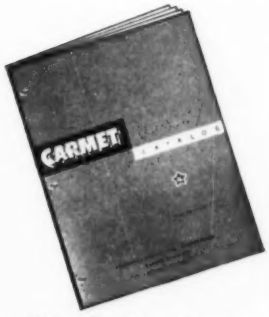
Ingersoll-Rand
17-663 11 Broadway, New York 4, N.Y.

PUMPS • CENTRIFUGAL & RECIPROCATING COMPRESSORS • DIESEL ENGINES • AIR & ELECTRIC TOOLS • TURBO BLOWERS • STEAM CONDENSERS

Look How You Can Save with PREFORMED CARMET®

DIE SECTIONS

these Blanks are preformed to a Finishing Allowance of .018"-.022" per side



Write for Your Copy:
CARMET CATALOG

Just out . . . 32 well-illustrated pages, containing data on all Carmet grades, and on Carmet blanks, tools, die sections, punches, draw die inserts, etc.; also special preforming to order. ● *Write for your copy.*

ADDRESS DEPT. A-93

These tungsten carbide die sections are of Carmet CA-11, a special grade developed expressly for punches, dies, and other heavy shock applications where wear and abrasion resistance are required.

These blanks have a span of 1.315", with a wall thickness of only .046", but they were easily produced to close tolerances by AL's precision preform methods. All surfaces are clean, smooth and free from defects, requiring only a minimum amount of grinding to final dimensions.

Carmet carbides can be accurately produced to practically any shape or size your designs may require, and can be supplied preformed as desired. Typical highly successful applications include inserts for drawing, heading, extruding and blanking dies; gauge and wear parts; pins; bushings; etc.

Find out, TODAY, how you can cut costs with preformed Carmet. Write or call *Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Mich.*

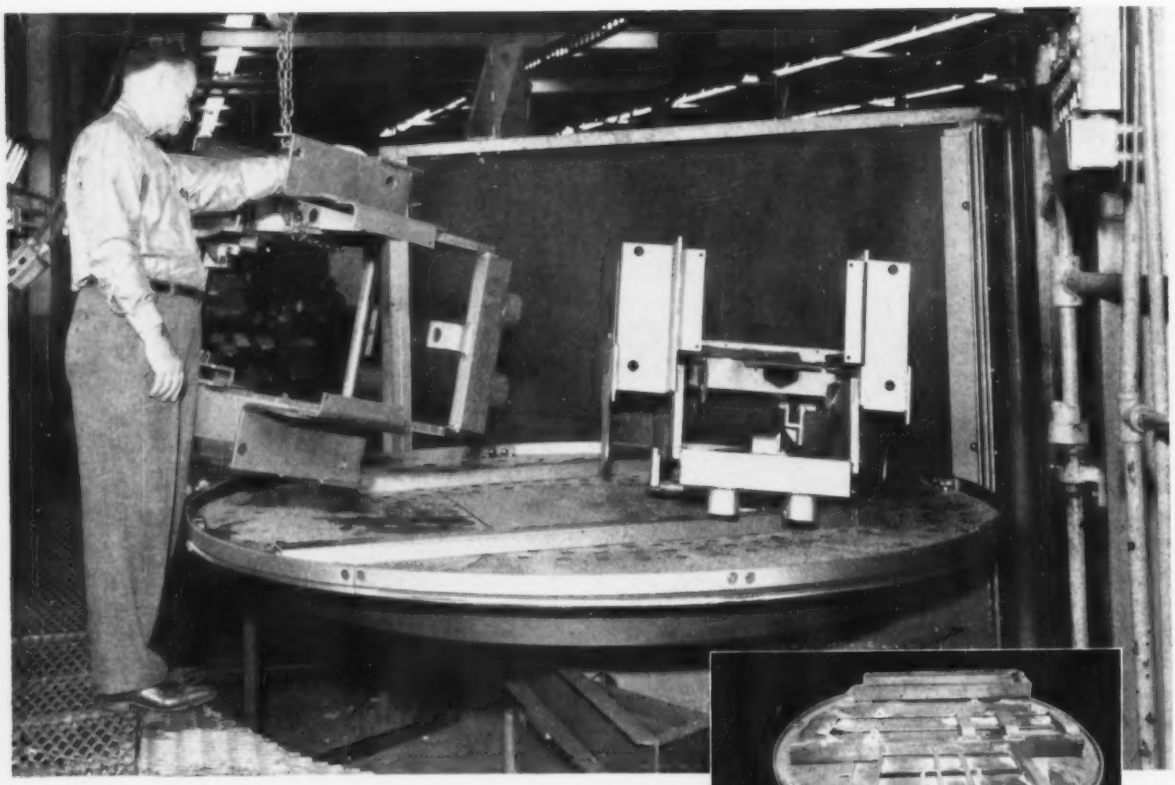
For nearest representative, consult Yellow Section of your telephone book.

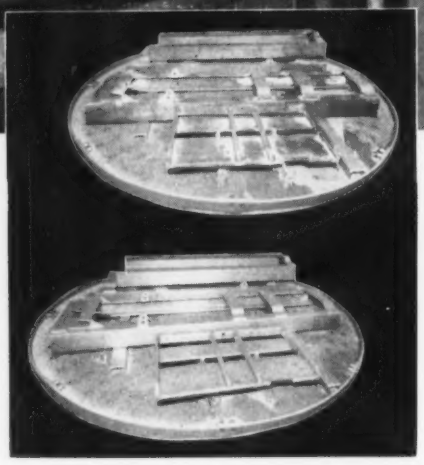
For ALL your CARBIDE needs, call

Allegheny Ludlum

WSW 6636

AL® FINE TOOL STEELS SINCE 1854





WHEELABRATOR® opens the door to $40,000 annual savings

Slashes weldment cleaning time ½ to ⅔ for Towmotor

Wheelabrator airless abrasive blast cleaning of lift truck weldments paid for itself in less than a year at Towmotor Corp., Cleveland, by replacing manual wire brushing and sanding. Annual savings were more than $40,000.

According to the Towmotor standards departments, saving like these have been reported: Pieces that required 37 minutes for cleaning and chipping are now Wheelabrator cleaned in an average time of 12 minutes, bringing savings of $2.43 per piece. Lift truck frames formerly requiring an average of 1¼ hours for grinding, sizing and cleaning now require only 35½ minutes, bringing $3.88 savings apiece.

Besides saving time and money, Towmotor reports the Wheelabrated surface provides a superior bond for painting and adds that quality is improved because substandard welds are exposed prior to painting.

Wheelabrator airless blast cleaning is the fastest method of metal cleaning known. There is a machine available for handling all types, sizes and shapes of work. Investigate the savings you can make with the Wheelabrator.

Write today for full details on Wheelabrator airless blast cleaning. Ask for Bulletin 74C

WHEELABRATOR
CORPORATION
510 South Byrkit Street, Mishawaka, Indiana

WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT

No matter which *FINISH* you like—you can buy it in

MicroRold® QUALITY STAINLESS STEEL

2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.

BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

WASHINGTON STEEL CORPORATION — MicroRold® — STAINLESS SHEET & STRIP

Washington Steel *Corporation*

Producers of Stainless Sheet and Strip Exclusively

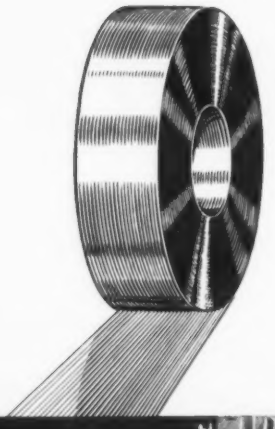
9-L WOODLAND AVENUE, WASHINGTON, PA.

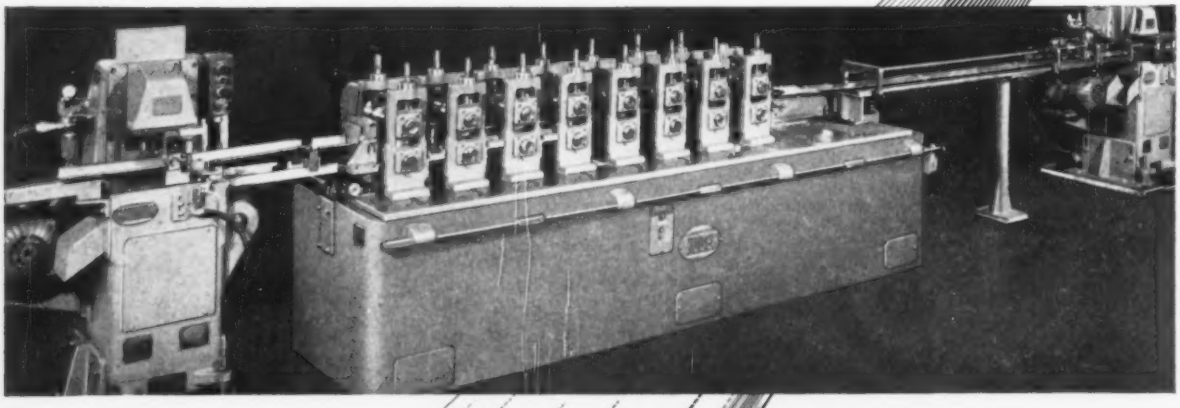
From Cold Strip to Finished Shapes

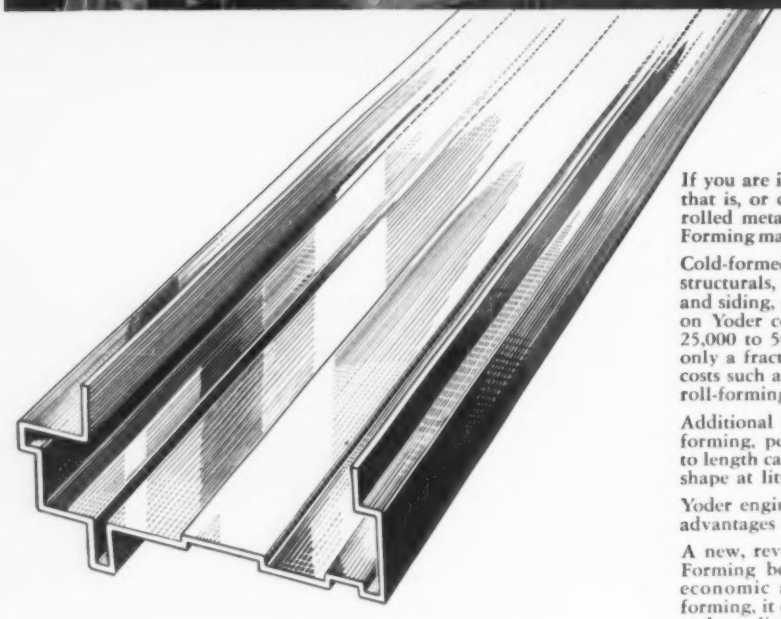
IN SECONDS

with a YODER

ROLL-FORMING MACHINE







If you are in the business of manufacturing a product that is, or could be, made wholly or partly from flat rolled metals in thicknesses up to ½", a Yoder Roll-Forming machine can help reduce your production costs.

Cold-formed shapes of every description – including structurals, tubular products, moldings, trim, roofing and siding, panels, cabinet shells, etc., can be produced on Yoder cold-roll forming equipment at the rate of 25,000 to 50,000 feet per day at a conversion cost of only a fraction of a penny per foot! With speeds and costs such as this, even part-time operation of a Yoder roll-forming line is a profitable investment!

Additional operations such as welding, coiling, ring forming, perforating, notching, embossing or cutting to length can be simultaneously introduced to the basic shape at little or no additional labor cost.

Yoder engineers are at your service in explaining the advantages of roll-forming for your individual needs.

A new, revised, Fifth Edition of the Yoder Cold-Roll Forming book is just off the press. In addition to economic and mechanical possibilities of cold-roll forming, it contains numerous illustrations of end uses and applications of roll-formed shapes. Write for your copy today.

THE YODER COMPANY
5510 Walworth Avenue • Cleveland 2, Ohio

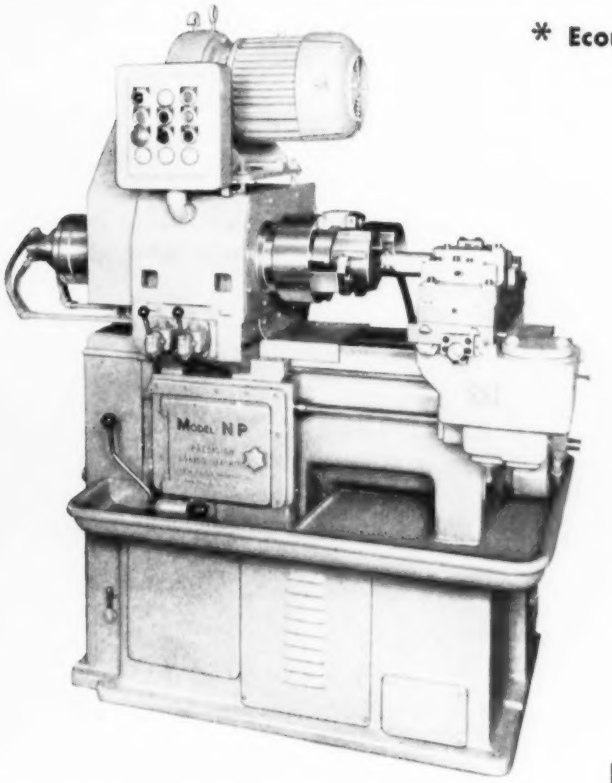
ENGINEERING **YODER** MANUFACTURING

COLD ROLL FORMING MACHINES

PIPE AND TUBE MILLS (ferrous or non-ferrous)

ROTARY SLITTING LINES

NEW MACHINE OF THE MONTH
NEW ECONOMY* IN PRECISION BORING

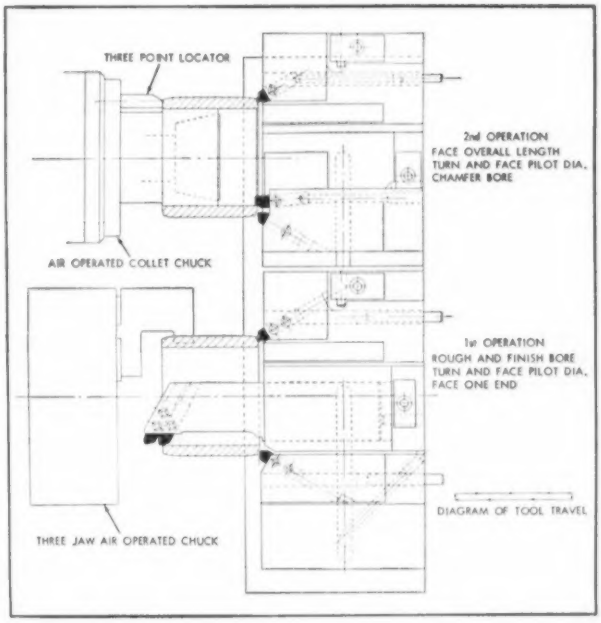


*** Economy in initial investment**
Economy in machining costs
Economy in maintenance costs
Economy in change-over time

The new Seneca Falls Model "NP" Precision Boring Machine is a top quality, reasonably priced, mechanically operated machine available with either one or two precision spindles mounted independently on a fixed bridge. Either the work or the tools can be rotated on the spindles. The patented "Quick Change-over Mechanism" permits variations in carriage stroke, rapid traverse and feed cycle without changing or purchasing additional cams and reduces average changeover time to less than thirty minutes. The design of the headstock bridge permits the installation of other makes of standardized boring heads.

Let our engineering staff help solve your precision machining problems.

The two-spindle machine illustrated above is equipped for boring, facing and rabbeting both ends of field rings in a single machine cycle. When the operator removes a finished piece from the rear chuck, he transfers a semi-finished piece from the front chuck and replaces it with a rough piece. When the starting button is pressed, the tools move forward in rapid traverse to cutting position, automatically shift to cutting feed, and finally return to starting position in rapid traverse. The entire operation is automatic. The field rings are 4-½" in diameter and a production of 60 pieces per hour at 100% efficiency is easily maintained. Tooling arrangement is illustrated opposite.



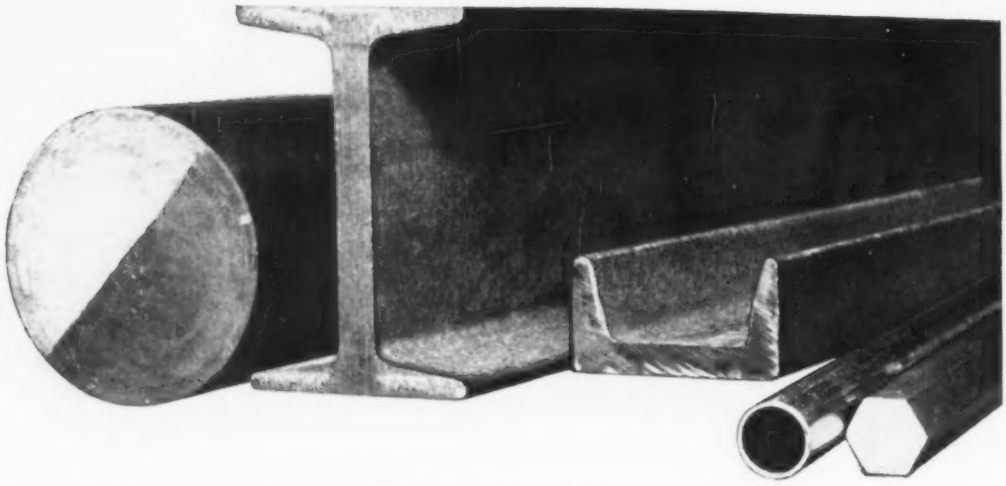
SENECA FALLS MACHINE

ENGINEERED FOR PROFIT

SENECA FALLS MACHINE CO.

SENECA FALLS, NEW YORK

Lo-swing Lathes and Seneca Falls Machine Tools, Automation and Electronics



METAL WORKING MEN TELL US...

3 major reasons keep them coming to Ryerson:

Flame-cut steel shapes save you money—
one piece or hundreds—almost die-cut accuracy.

1. Biggest stocks—nobody comes even close to the size and variety of Ryerson inventories.

2. Unequalled processing facilities—assuring fast, accurate service on any requirement.

3. Dependable, certified quality—at fair prices—whether steel is plentiful or scarce.

RYERSON STEEL

PRINCIPAL PRODUCTS IN STOCK

CARBON STEEL—bars • structurals • plates • sheets tubing, etc.

STAINLESS—Allegheny Metal pipe • tubing • sheets • plates bars, etc.

ALLOY STEEL—including case hardening, direct hardening, heat treated and Rycut free-machining leaded alloys.

OTHER PRODUCTS—safety plate • grating • expanded metal • chain • wire rope • reinforcing bars • plastic sheets • pipe & tubing • machinery & tools.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK · BOSTON · WALLINGFORD, CONN. · PHILADELPHIA · CHARLOTTE · CINCINNATI CLEVELAND · DETROIT · PITTSBURGH · BUFFALO · CHICAGO · MILWAUKEE · ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

Finds Hidden Metals

Here's a portable transistorized metal detector, weighing only 4 lbs, that sounds off through a pair of earphones when it comes near hidden metals. Possible uses: searching for reinforcing bars in concrete; uncovering hidden metal roof-supports in mines; or any metal finding job that can be likened to the proverbial search for a "needle in haystack."

Better Brazing Techniques

Army-sponsored research has thrown new light on some old brazing questions. One project proved that the bond in brazed joints forms by an extremely fast saturation of filler metal by base metal, followed by precipitation of base metal dendrites at the base-filler interface during cooling. Another conclusion: brazing temperature can alter the structure of a joint but not the tensile strength.

Electricity From Gases

Using hydrogen and oxygen for fuel, scientists have developed a "fuel cell" capable of producing thousands of watts of electric power silently and economically. First application is to provide silent electrical power for the Army Signal Corp's "Silent Sentry," a portable radar set that detects enemy movements despite smoke, darkness or fog. Developers say that, theoretically, life of these fuel cells is unlimited.

Ductwork In A Hurry

At least three major companies are pooling their efforts to perfect a fiberglass duct containing a layer of aluminum foil. Advantage is that ductwork could be shipped flat, assembled and fastened with aluminum staples by homeowners or other unskilled persons.

Linear Ball Bearings

Rows of ball bearings run longitudinally in a series of adjustable diameter bushings just introduced by an eastern manufacturer. Designed for linear motion applications, the bushings are said to run free without play. They're split longitudinally and will provide line-to-line or slight preload fits when mounted in adjustable diameter housings. Standard sizes will fit shafts from one to four inches in diameter.

Ponder Revised Bulletin F

Revised version of the government's Bulletin F schedule of useful lives for depreciable property won't be out for many months. When the August 30 deadline for suggested revisions passed, about 135 had come in from companies, trade associations and individuals covering about 15 major industries. An advisory group of government and outside experts will take four to six months to develop a revised list.

Trend In Mergers

Future steel mergers will probably continue to be marked by diversification rather than additions to existing lines, as well as emphasis on more profitable products. The new merger of Copperweld Steel with Superior Steel, and Jones & Laughlin's recent acquisition of Rotary Electric and Cold Metal Products have all had these points in common.

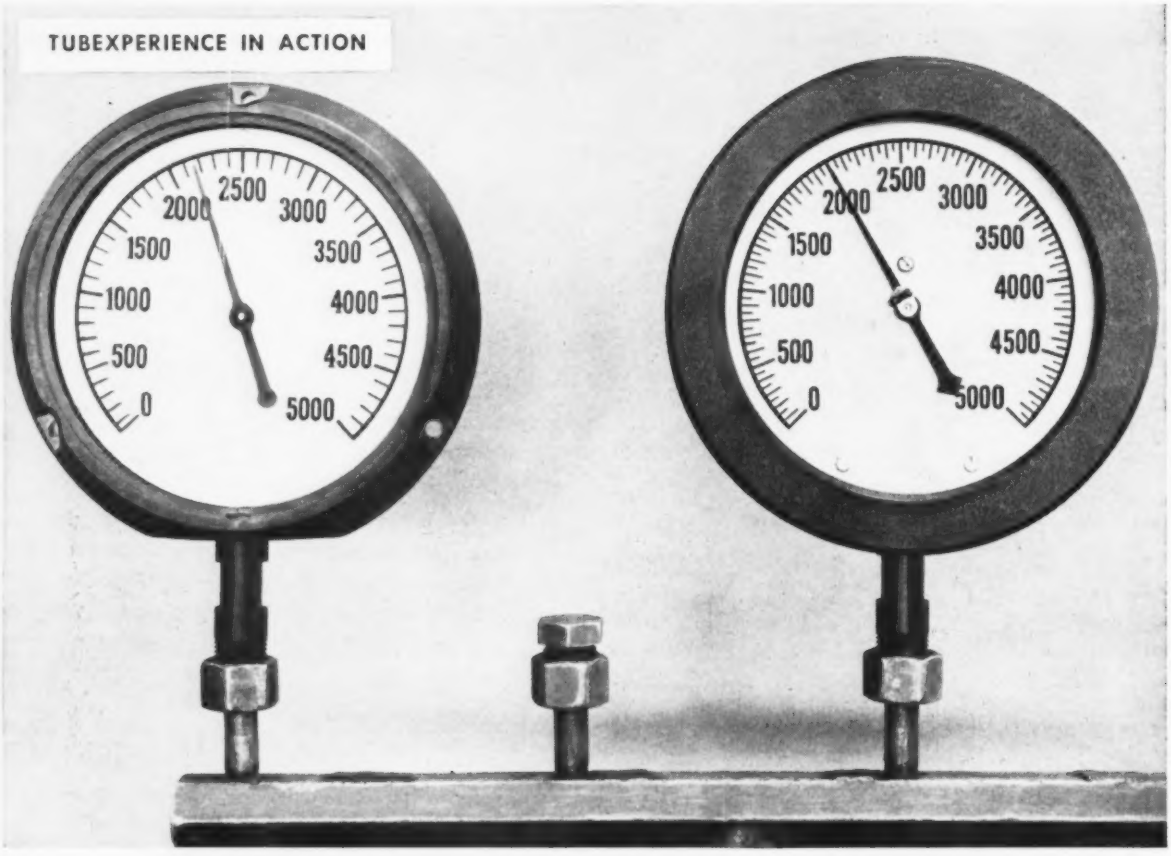
Seven Miles of Titanium

Largest industrial order for fabricated titanium in the history of the industry is said to be one for seven miles of seamless tubing. The material will go into heat exchangers used in processing nickel and cobalt ore. The order calls for extruding 2130 sections of pressure tubing, each 17½ ft long.

OK Dry Film Lubricants

Some dry film lubricants have outstanding high-pressure and anti-wear properties, according to Air Force tests. The most successful types have excellent properties for plain bearing applications at low speeds. Life and load-carrying ability of these dry films depend on the resin bonding agent used, also the pretreatment given the metal surface. Maximum life is obtained when both bearing surfaces are coated.

TUBEXPERIENCE IN ACTION



Q. Which gage tells the truth longer?

A. *The gage with the Superior extra-quality Bourdon tube*

HERE'S WHY—

Quality cannot be inspected into tubing. Thus at Superior the quality is built in from start to finish. Stock for redrawing is carefully selected and prepared. Superior's method of producing Bourdon tubing includes many special techniques, developed through years of "tubexperience." Such factors as surface quality, close dimension control, freedom from decarburization, accurate shaping and cleanliness, all combine to produce a Bourdon tube of unexcelled quality.

Cheap Bourdon tubing no economy. Why risk having your gages fail or lose their accuracy? Inferior quality Bourdon tubing will crack, develop leaks, or take a set long before Superior's will show any signs of wear.

Quality Bourdon a must. The Bourdon tube represents only a small fraction of the total cost of your gage, yet it is the most important single element. Be sure to get only the best Bourdon tubing available.

Specify Superior. There are 8 different Bourdon analyses to choose from, including Ni-Span C. Flat ovals, ellipticals, rounds and partial rounds, etc. For technical data on Superior extra-quality Bourdon tubing, write for a free reprint of "Bourdon Elements Require Special Tubing." Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to $\frac{5}{8}$ in. OD—certain analyses in light walls up to $2\frac{1}{2}$ in. OD

West Coast: Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

You Can Cut Costs Through Tight Inventory Control

Potential Savings Are Worth Looking Into

Carrying excess inventory can be an expensive luxury. Here are some answers to better control.

A simple formula has worked wonders for big and small companies—By K. W. Bennett.

▪ How much money does your inventory drain out of the business?

Working capital is tight. Interest rates are rising. Yet, inventory levels are climbing, soaking up dollars that could be used elsewhere.

What's It Cost? — Remington Rand estimates that metal fabricating inventories cost an additional 25 pct of their original price each year. The figure varies. A major automotive producer believes inventory costs the firm 20 pct over original purchase cost before it is used. A farm equipment manufacturer uses 15 pct. An electrical parts manufacturing plant uses 16 pct.

It's possible to work up a general formula—the so-called Economic Order Quantity formula—for the best lot-size for almost any inventory item purchased or manufactured. The method is used, for example, by International-Harvester, as one step in the company's inventory control program.

Formula at Work—An example used by International-Harvester in its training program: A steel pin is to be purchased, and the company normally uses 12,000 of these pins per year. The seller has submitted three lot sizes with price reductions for the larger lots. The work sheet would go like this:

Quantities considered: 1000, 2000, and 12,000.

Unit price: $1.00, $0.90, and $0.87, respectively.

Purchase cost (annual use x unit cost): $12,000, $10,800, and $10,440, respectively.

Ordering cost (number of receipts x fixed clerical ordering cost of $5): $60, $30, and $5, respectively.

Inventory carrying charge (average inventory x fixed cost of 15

Electric Supply Corp. Photo

What it Costs To Carry Inventory

A survey of eight plants shows that for every $100 worth of materials bought, the average yearly inventorying cost is $19.37.

This average carrying charge is largely accounted for by these costs:

✓ Interest on capital invested	$3.5 - 7
✓ Taxes	0.5 - 2.55
✓ Insurance	0.2 - 1.0
✓ Warehousing	0.2 - 2.25
✓ Handling	2.0 - 4.0
✓ Clerical and inventory-taking	1.0 - ?
✓ Obsolescence	3.85-10.0
✓ Physical deterioration, pilferage	1.5 - 5.0

International Harvester Photo

How To Cut Inventory Costs

Standardize products parts, so that a single part can be carried on multiple-product stocking program.

For perpetual inventory, photograph file cards rather than have inventory work-sheets typed from original cards. This can cut the job from two weeks to several hours.

Figure the historical number of rush orders for finished product by month, and overorder parts to cover these, to cut expediting costs. Usually this is limited to high dollar value items.

Exchange excess materials lists every two weeks or monthly by inter-plant letter. Some firms with several plants use standard ditto forms made up as monthly inventory records are checked.

Form a parts committee, including design engineers and materials men. Their main job: To standardize parts. Make meetings of the committee a regular, scheduled event.

Study the historical records of your inventory. Use past history to estimate best inventory turnover rate, annual usage of single items carried in inventory, probable danger of "runout," and seasonal variations in inventory needs.

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pct): $75, $135, and $783, respectively.

Total cost: $12,135, $10,965, and $11,228, respectively.

Best Buy—Since the normal use is 1000 units per month, average inventory was figured at one-half that, or 500 units. In this case, 2000-unit lots were the best buy.

John Marley, president of the National Association of Accountants, and consultant on inventory problems, has reduced the paperwork to a mimeographed form sheet that can be worked out by the purchasing agent's stenographer without danger of inaccuracy.

Formula Broadened — In June this year, Booz, Allen & Hamilton described to the American Institute of Industrial Engineers an advanced formula. This figures optimum inventory levels, based not only on the inventory carrying charge factor, but resupply cost. A third factor, the cost that results if inventory drops too low and production is halted or a customer is kept waiting for lack of a part that should have been in inventory and wasn't. It will reduce inventory runout possibilities by as much as two-thirds.

The small firm can't run off in all directions at once in attacking an inventory control problem. One of the most practical, widely-used means of whittling an inventory problem to solvable size is General Electric's ABC system. (IRON AGE, May 9, 1957.) Every item in the inventory is listed in increasing order of total dollar value. A part that costs a dollar, if you use one thousand a year, would receive priority over a part costing $100, if you used only five of the latter annually.

Priority Rating—"A" items get top inventory study. The division point is arbitrary. Those items representing 75 pct of total inventory value, for instance. "B" items receive attention when the fire has been put out in the "A" bracket. "C" items come last. A GE plant might carry 2-3 weeks supply of "A" items, with a 2-3 weeks reserve. A "B" class item might be allowed double that amount in inventory. A "C" item will probably end up in a stock room bin and may be ordered only three or four times a year.

At Bodine Electric, a smaller company, "A" class high-cost items are carried in an inventory amount tied closely to the actual sales order book. As a precaution against runout, a safety cushion is added. A few additional parts in inventory, based on the historical pattern of

"rush-rush" orders. "C" parts are purchased only four to five times annually and stocks are based largely on historical average use. Used with the EOQ formula, the system produces amazing results. Inventory turnover has gone from nine months to three months. With the safety cushion for "A" parts, delivery of finished equipment to Bodine customers has been excellent.

Classic Example — The bin reserve for inventory storage of "C" items deserves special mention. In a classic case, GE cut inventory postings at one plant from 17,000 per year to 1500 per year. The bin system for "C" parts can cut stockroom manpower needs in half.

What about inventory turnover? A high turnover rate is generally accepted as the proof of good inventory control. But every order you write costs money. It may cost just $2 or $5 (both figures are being used in inventory control systems). It may even cost $20. Whether it's a work order or a purchase order, paper work costs money. So on a low-cost inventory item, it's best to keep orders large and order less often. The EOQ formula includes paperwork costs, but most firms tend to rate paperwork costs lower than they should.

Machines Helpful—Turnover is merely annual output divided by average inventory. Most concerns figure average turnover in the past several years, compare it with the profits in those years, and decide what turnover rate has been best for them in the past. Knowing optimum turnover rate is an aid in correcting inventory during a sales slump.

Inventory specialists recommend mechanized business equipment. Whether it's a mechanical brain or a punched-card sorter, it will pay its way.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept. The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Do Industry's Books Inflate Profit?

Corporate profits in past decade, MAPI study states, were $144 billion, not the $187 billion industry reported.

Reappraisal of the accounting methods that created the "distortion" is urged.

▪ Industry's accounting methods, according to a corporate profits study by the Machinery and Allied Products Institute, are contributing to the "economic myth" that earnings are abnormally large.

"If the American corporate system had shown its true profits of $144 billion for the decade (1947-56) rather than the $187 billion it did show," MAPI states, "it would have saved itself much misdirected criticism and attack."

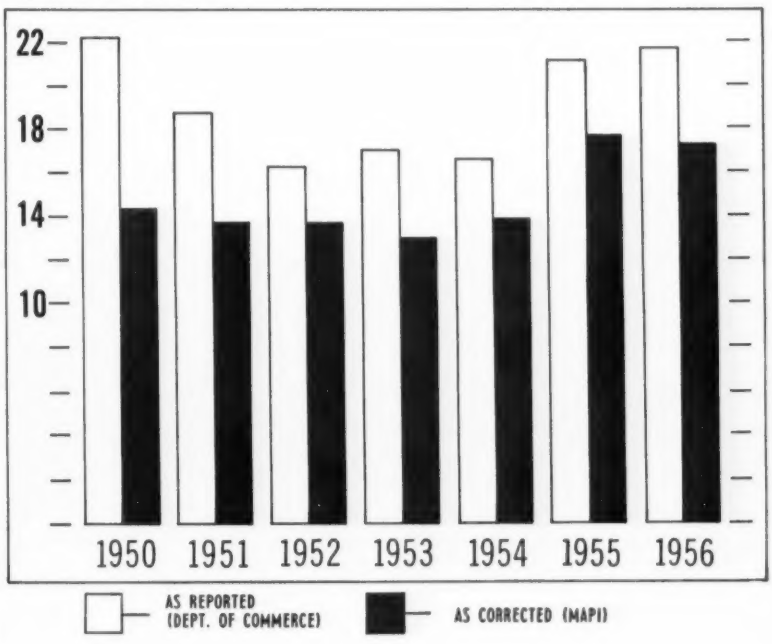
Self-Deception?—"Many corporate officials," it's pointed out, "are keenly aware of the illusory character of the profits they have reported in recent years . . . many have taken them at face value.

"It is impossible to believe this self-deception has been harmless. Management can arrive at sound decisions on policy only when correctly informed of the facts. If its accounting system yields the distorted version of the facts . . . its judgment is necessarily handicapped. Surely it behooves management to reconsider the accounting practices that have created the distortion . . ."

Too Much, Too Long—Based on the study's results, comparing 1947-56 profits with those of 1923-29, there's evidence that:

Postwar corporate profits were overstated by excesses averaging more than 30 pct for the decade.

Is Industry Overstating Its Profits?



Steel Heading Into Fall Upturn

Mills report gradual gain in orders. Chicago mills extend sheet, strip delivery promises.

But producers are disappointed. Pickup is slower, smaller than expected. — By G. J. McManus.

▪ Two weeks ago, Chicago mills were offering to deliver cold-rolled carbon sheet and strip in three to five weeks. This week, the best they can do is four to six weeks on strip, seven to eight weeks on sheets.

Is this the beginning of the long-awaited pickup in flat-rolled sheet demand? It certainly looks like it, but the mills are only mildly elated about the upturn. And apparently Chicago is doing better than producers in other parts of the country.

Buildup Gradual — Still, there seems to be a feeling that the sheet and strip market has finally turned the corner. The mills look for a gradual buildup beginning this month. Some other products are sharing in the upward trend.

September shipments of a major sheet producer will be up 30,000 tons over August. During the last two weeks of last month, new orders of one big mill ran ahead of shipments for the first time this summer.

Case History—One automotive subassembly plant has been increasing sheet orders like this: August, 1400 tons; September, 2600 tons; October, 4000 tons; November and December, 5000 tons expected.

One bar mill is boosting production like this: August, 72 pct of capacity; September, 78-80 pct; October 85-88 pct.

Despite these and other signs of prosperity, September has been a disappointment to many steelmakers. In part their feeling is subjective: Business is better but it is not so good as they had hoped and expected. There are also a number of very real considerations.

Auto Orders Gain — For one thing, automotive orders are building up more slowly than was expected. The automotive industry was supposed to spearhead the fall climb in steel shipments. The industry has been responsible for most of the gains to date. Cold rolled sheet, stainless strip, alloy bars, and carbon bars have been going to Detroit in growing quantities.

But automotive orders are two to three weeks behind expected timetables. Detroit buyers are waiting until about 35 days before the start of the month before placing definite orders. They will come in even later to juggle schedules or get extra tonnage. Many of the orders are still for trial quantities—5000 to 10,000 lb of stainless strip.

Detroit Needs Steel—Steelmen are generally agreed that the automotive orders for steel have got to increase sharply, that it's a case of delayed but not reduced requirements. They feel automakers are down to rock bottom on inventory. In this connection, one of the Big Three recently came to at least three mills with orders for additional cold rolled sheet in September. According to the story, a major plant would have been shut down if the mills had not been able to make 10-day delivery.

Apart from automotive the picture is spotty. Wire producers, electric furnace operators and non-integrated specialty mills have been working at 50-60 pct of capacity. There is little prospect of a wire

improvement. Producers are offering 5-10 day delivery for manufacturer's wire and rod. This will tend to delay any pickup—probably into November—and merchant wire sales are dipping seasonally meanwhile.

Electric furnace operations are due to climb as orders for stainless strip increase. Other stainless products show little improvement. Producers are offering short deliveries; defense cutbacks have hurt.

Linepipe Strong—The pipe picture figures to remain constant during the fourth quarter. Demand for standard pipe is off. Same is true of mechanical specialties. Linepipe and oil country seamless are still strong. Much of the steam has gone out of the oil country market but four major producers expect to operate seamless mills at capacity at least until the end of the year.

One pipe mill will have a month's carryover of oil country orders going into the fourth quarter. Another is booked through November. A third says mill stocks are nonexistent and that any sales slack will be taken up by rebuilding these.

Plates On Quota—Heavy plates and structurals continue on a quota basis. Despite lags in construction equipment and general machinery, there is little chance of a surplus in heavy steel products before the end of the year.

Tinplate production is expected to drop at least 15 pct in the fourth quarter. The normal seasonal decline will be accentuated by a poor crop year, large inventory accumulations, and increased capacity of the mills. A big price hike Jan. 1 could stimulate buying; a small increase wouldn't mean much.

One Mill's Opinion—Adding up all these strong and soft spots, one mill with a broad product base is now looking for fourth quarter operations slightly under 85 pct.

"We're less bullish than we were 30 days ago," says a sales executive for the mill. He feels automotive orders are coming through at a satisfactory rate.

Sharon Steel Head Steps Down

Henry A. Roemer relinquishes reins to younger management executives.

James A. Roemer becomes chairman. Alfred M. Tredwell, Jr., named president.

Henry A. Roemer

▪ Henry A. Roemer, one of the last active major steel empire builders, will hand the management reins of Sharon Steel Corp., which he has held since 1930, to a young management group, it was announced here today.

Mr. Roemer will relinquish his post as chief executive officer, chairman of the board, and president of Sharon Steel. But he will continue as a director and chairman of the company's executive committee.

Successor—Succeeding him will be James A. Roemer, president of Mallory-Sharon Titanium Corp., who is elected Sharon's chairman of the board, and Alfred M. Tredwell, Jr., who is elected president. Mr. Tredwell, formerly vice president, operations, was also elected a director and a member of the executive committee. James A. Roemer will continue as head of Mallory-Sharon. (See page 88.)

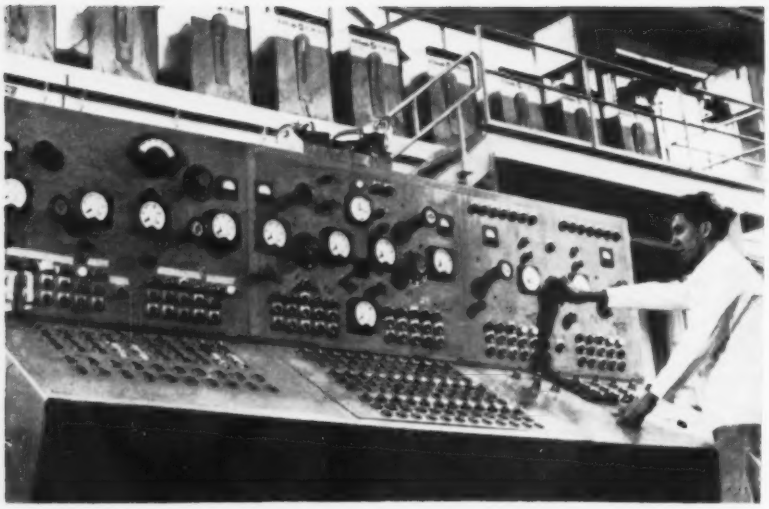
Another change was the election of Wilbur T. Blair, vice president in charge of finance and treasurer, to the board of directors.

Big Job Ahead—"The realignment of our executive team," Henry Roemer said, "is part of our current expansion and modernization program."

Henry Roemer is one of the outstanding leaders and developers of the steel industry in America. He began his long career 58 years ago when, at the age of 14, he started work in a blast furnace at Struthers, O.

James A. Roemer

Alfred M. Tredwell



REMOTE CONTROL: For safety reasons and to assure continuity of production, Mallory-Sharon titanium melting is controlled from panel.

Special Metals Company Formed

New firm, Mallory-Sharon Metals Corp., will be largest integrated producer of titanium and zirconium.

It's jointly held by P. R. Mallory, Sharon Steel, and National Distillers.

Three companies prominent in the fields of titanium, zirconium, and other light metals are combining their assets to form "the largest integrated company" in the special metals industry.

Formation of a new jointly-held concern with assets above $55 million has been announced by P. R. Mallory & Co., Inc., Sharon Steel Corp., and National Distillers and Chemical Corp.

Under the agreement, Mallory-Sharon Titanium Corp., now jointly owned by P. R. Mallory and Sharon Steel, will acquire all the titanium and zirconium facilities of National Distillers. In addition it will obtain entire ownership of Reactive Metals Inc., which is now owned jointly by National and Mallory-Sharon.

Every Process Step — Following transfer of the metal facilities, Mallory-Sharon will change its name to Mallory-Sharon Metals Corp. As such it will be owned one-third each by National Distillers, P. R. Mallory, and Sharon Steel. James A. Roemer, now president of Mallory-Sharon Titanium, will be the president of the new firm.

"This consolidation of interests," the three participating companies state, "creates a completely integrated special metals company with technical "know-how" and facilities for every step from original chemical process to production and fabrication of finished products. The benefits from this strengthening of operations, plus the combination of current and future research activities, holds great promise, not only for present production of titanium and zirconium, but for other special metals as well."

Reduction Method Included — Joseph E. Cain, president of P. R. Mallory adds, "This consolidation gives Mallory-Sharon an entrance into the promising zirconium field, and with National's contributions in chemical metallurgy, Mallory-Sharon will be able to make still further progress in improving production techniques and in its search for new and better alloys."

The new firm will be granted an exclusive, royalty-free license in the U. S. to a sodium reduction process developed by National for the production of titanium, zirconium and other metals. "The process," says Dr. Robert E. Hulse, National's executive vice president in charge of chemical operations, "is believed to be the lowest cost method developed to date for the production of metal sponges."

What They Contribute—About the companies involved in the new setup: Mallory-Sharon is the nation's second largest producer of titanium mill products. Currently able to melt 1 million lb of titanium at its Niles, O. plant, the firm has been purchasing its titanium sponge on the open market.

National Distillers, supplying zirconium sponge to the AEC, has under construction a plant at Ashtabula, O. The plant has a designed productive capacity of 10 million annual lb of titanium and 2 million lb of zirconium sponge.

Copperweld, Superior Plan Merger

Copperweld Steel Co. and Superior Steel Corp. have agreed "in principle" to a merger plan. The move would bring together basic melting facilities and non-integrated finishing capacity.

Copperweld operates seven electric furnaces with a combined capacity of 660,000 tons.

Good for Finishing — Superior has no melting facilities. But it has a capacity for 115,000 tons of hot rolled strip and 80,000 tons of cold rolled strip.

Armco Has New Stainless Steel

It Is Developed Especially for Aircraft Use

PH 15-7 Mo is Armco's answer to the friction heat challenge of MACH 4.

As a result, aircraft and missiles may become stainless steel's biggest customer.

■ A new high-strength stainless steel capable of withstanding air friction heat up to 1000°F has been developed by Armco Steel Corp.

Designated Armco PH 15-7 Mo, the new steel is described by R. L. Gray, Armco president, as a low-cost aircraft material which will be used mainly for skins and major structural parts.

Cost Is Low—The new steel is made in conventional electric furnaces and rolled on continuous strip mills, thereby making it available in commercial quantities at an economical cost, Mr. Gray said.

To turn out PH 15-7 Mo and other specialty steels in quantity Armco is spending about $70 million for improvements and expansion at its Butler, Pa., works. The expansion will include one of the most powerful 54-in. hot strip mills in the world, Armco claims. A new Sendzimir cold reduction mill for finishing 48-in. cold-rolled stainless coils to precision thickness will also go into the plant.

Easily Worked—This equipment will enable Armco to produce thinner, wider, and flatter sheets of stainless steel rolled to the closer-than-standard tolerance required for aircraft and missiles of the future, Mr. Gray said.

In addition to its low cost and high strength, PH 15-7 Mo has the advantage of other precipitation hardening steels in its ease of fabrication and resistance to corrosion. "It provides the best combination of characteristics for aircraft and missiles flying up to 2700 mph of any metal available today," says Mr. Gray.

Big Customer—He pointed out that within the last five years, aircraft and missiles have become the second largest user of stainless steel. About $75 million worth of stainless steel went into aircraft and missiles in 1956. He predicts the industry may take $200 million worth annually within five years.

"Although the production pattern of air weapons is difficult to predict right now," he continued, "our market analysts are convinced that within the next five years the aircraft and missile industry can become the top user of stainless steel . . ."

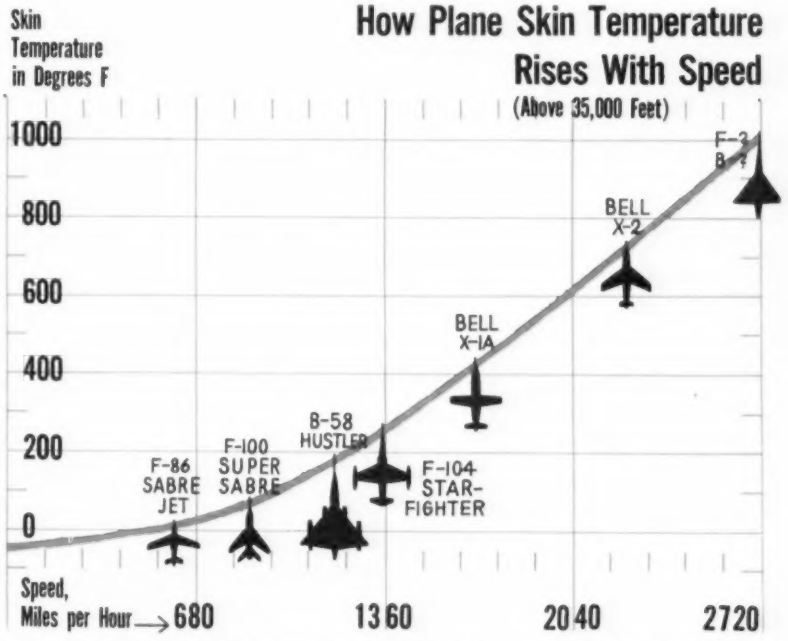
The new steel contains 15 pct chromium, 7 pct nickel, and a small percentage of molybdenum.

Licenses Offered—Mr. Gray announced that Armco will license other steel companies to make and sell its earlier precipitation hardening grades—17-7 PH and 17-4 PH.

R. G. Sloan, manager, Armco's Development Engineering Dept., said the company learned recently that the new steel "has been selected for the design of one of the most important planes now on the drawing boards."

Mr. Sloan added that PH 15-7 Mo "is the only high-strength elevated temperature metal readily available in volume in all forms—sheet, strip, foil, plate, bar, wire, forgings, and soon extrusions."

The new steel was introduced at a press conference Sept. 10. Mr. Gray, Mr. Sloan, and M. E. Carruthers, supervising metallurgist, described its outstanding properties.



PLANE MAKER'S PROBLEM: Finding skin materials able to withstand terrific air friction heat is one of aircraft industry's primary tasks. Armco's new stainless steel, PH 15-7 Mo, is the latest effort in this direction.

Pheoll Manufacturing Co. Photo

Fastener Sales Swinging Upward

After a poor second quarter, August ordering took a surprising turn for the better.

Backlogs are mounting. The last quarter may see some producers working overtime.

■ Fastener production, another of the historic barometer industries, is headed for a 5 pct dollar gain in 1957 sales volume. For an industry that has yet to hear from two major customers, appliance and automotive, an August sales gain is something more than a mild surprise.

Thus far this year, the industry hasn't done badly. Fastener manufacturers zipped through first half with a 4 pct dollar volume gain over first-half 1956. There were some wide variations from the average. Individual manufacturers did as little as 8 pct less or as much as 10 pct more than the average. Most of the business was done in first quarter.

Forecasts Changed—By the end of June, a few forecasters were hauling down their targets and pointing out that screw machine products, a sister industry, was off 8 pct in the same period and showed no sign of a gain. Standard fasteners were hit as early as late first quarter, but by the end of second quarter, the entire range of fasteners was sliding downward.

The first sign of the current rebirth in sales hopes came in July. When the month ended, a smattering of companies in the fastener field found sales had totaled as much as 15 pct more than the same month last year.

A Typical Report — There weren't enough of these filling order books to do more than stop the industry slide. July sales for the industry dropped, but no more than is usual during the summer season. After the express elevator drop reported by many companies during second quarter, this alone was a heartening sign.

Optimism Prevails—The industry still hasn't emerged from the shadow of the second quarter decline. But reports of a more seasonal pickup are coming in. This is without any great strength from such major markets as automotive and appliance. One important fastener producer reports a 25 pct gain in his backlog over the past 30 days. This one happens to serve some television accounts (currently a market that is generating growing heat), and he's had a steady, though not sharply increasing, demand from the major appliance producers since late July. His backlog is increasing.

Customer inventories of fasteners and screw machine products are low. A spate of rush orders began in July and is gaining strength with the opening of September. Unlike the fall of 1956, when customers overloaded inventories to avoid supply difficulties following the steel strike, the fastener customer has cut to the bone. Inventories of 60 days as late as second quarter are now reported as low as two weeks.

Some fastener men argue they can see little sales gain. But the fact remains, substantial gains have already been made by an important segment of the industry. Some regard the 5 pct dollar increase for this year as a very conservative figure, and feel that the industry will do at least 10 pct more dollar business than last year.

Lamson & Sessions expects sales to top last year's record $39 million, but says higher prices will largely account for it.

It's beginning to look like a very warm autumn. The short-term problem of sales dropoffs is being licked. The long-term problem of showing a fair profit return still needs work.

Congress Did a Lot of Talking—

But Industry Got Little Help From Capitol Hill

Tax cuts and more realistic depreciation policies are still in the future.

But 1958 could be better for industry. Elections will spur action—By G. H. Baker.

▪ Metalworking gained little from Congress this year. The eight-month legislative session that called it quits just before Labor Day was long on talk, but short on helpful action for industry.

From metalworking's point of view, the Capitol was strangely inactive this year on such all-important subjects as lower taxes, more realistic depreciation of plant and equipment, and ways to end racketeering in unions.

Wait Till '58 — Despite all the political backing and filling that took place on subjects ranging from civil rights to egg prices, the Senate and House together managed to grind out about 400 new laws. Few of these new laws, however, will have any direct effect upon metalworking.

Keep in mind that the most meaningful portion of this (85th) Congress lies in 1958, not 1957. For next year is an election year. All of the House of Representatives and one-third of the Senate will be running for re-election next year. Thus, a much more rewarding climate for political good works is assured.

Tax Cut Coming?—Tax reduction, aid to the minerals industries, and more social security are typical of the attractions to be offered the voters in next year's elections.

Both political parties sensed what is probably a genuine revolt at the voter level against inflated government spending. People naturally resented being told to spend less when their government was getting ready to spend a record (peacetime) amount. As a result, a substantial start was made this year toward leaner budgets.

Biggest economic issue before the Congress this year was the Eisenhower Administration's so-called "tight money" policy. "Tight money" was "sold" to the White House by the Federal Reserve Board as the most effective means of combatting runaway inflation. Democrats, historically committed to "cheap money" (low interest), railed long and loud against the costlier money rates, but actually wrote no new laws to counteract the Reserve Board's policy.

Inflation Bugaboo — Whether "tight money" is the correct solution to the problem of inflation is yet to be proven.

	YES	NO
Cut Taxes		X
Retard Mergers		X
Tighten Labor Laws		X
Aid Minerals Industries		X
Aid Other Nations	X	
Streamline Gov't		X
Stop Gov't Competing		X
Let Industry Develop Atom	X	
Extend Fast Write-Offs		X
Trade Food For Minerals	X	
Restrict Price Freedom (S.11)		X
Force Competitive Bids		X
Broaden Social Security		X
Raise Minimum Wages		X
Decontrol Gas Rates		X
Spur Home Building	X	
Guarantee Civil Rights	X	
Increase Postal Rates		X
Write Flood Insurance		X
Aid Depressed Areas		X
Aid School Construction		X
Tighten Lobby Laws		X

WHAT CONGRESS VOTED THIS YEAR—"Yes" means a new law on the subject is now on the books. "No" could become "yes" next year, as all issues remain live throughout the 1958 session of Congress.

Diamonds Reflect Industry Pace

De Beers Hunts New Mines to Meet Demand

Makers of industrial diamond tools are barely keeping abreast of orders.

Continuing research puts sparkle into automation applications.—By G. G. Carr.

▪ Industrial diamond sales continue to reflect relatively high metalworking activity. Comments of diamond tool makers could be those of many other parts of industry: Business could be better, but it's by no means bad. And a fall upturn is a distinct probability.

Supplies are adequate, but on the tight side. Crushing bort in particular carries a price premium over the landed U.S.A. cost. This contributed to a price boost this month for diamond wheels. But the current price is unlikely to change for several months at least. On the other hand, more ample supplies are not foreseen for some time.

De Beers Explores—Price and supply both hinge on the same fact: At least 95% of all diamonds come from Africa through the famous De Beers syndicate. De Beers claims it is now shipping all the industrial diamonds and bort it is producing, and diamond traders believe the syndicate is actually living hand to mouth as far as industrials are concerned.

New African fields are being developed, but they will not be producing for some little time yet. And De Beers will probably want to refill pipelines before actually marketing any of the new stocks.

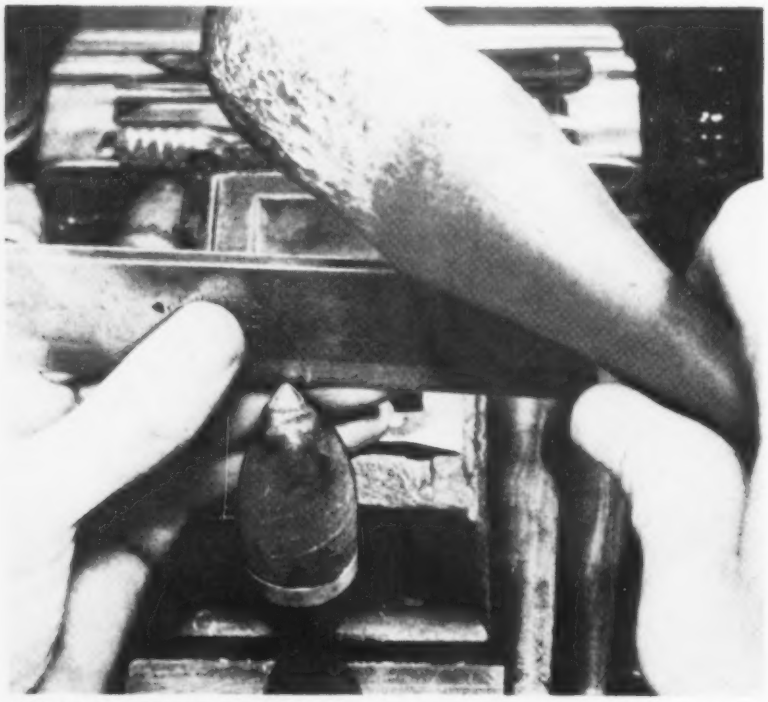
Precision Demands More—Even when new supplies hit the market, it is unlikely that prices will drop. W. L. Huber of Diamond Tool Research Co., New York, believes that growing and potential uses of industrial diamonds will soak up any softness which might develop.

Mr. Huber points to the growing demand for higher tolerances in fabricated materials throughout industry as an ever-expanding market for diamonds. Growth of carbide tooling and precision grinding are two prime examples of steadily increasing markets.

New Uses—New research work may give diamonds an even more important role in automation. A diamond will vary in hardness throughout its body. It is now proving possible by X-ray to select the strongest portion of the diamond crystal for cutting and mounting as a tool. This in turn permits prediction of the life of the tool, a prime consideration in automation.

Currently, the market for industrial diamonds breaks down to about 40 pct for grinding wheels, 40 pct for mining bits & saw blades, and 20 pct for miscellaneous tools. All of these areas show good growth potential, with stone and glass drills as relative newcomers.

Defense Impact Wanes—Use of industrial diamonds in the past has been subject to some fluctuation with defense orders. Polishing of jet engine blades, for example, is a prime application for diamond wheels. But with the spread of high tolerances throughout more and more of industry, defense ups and downs have a steadily decreasing effect. The 100-odd major producers of diamond tools and wheels can expect steadily increasing markets as tolerances get smaller and harder materials come into more general use.



DELICATE TOUCH: If diamond has been grooved properly, a light tap of mallet is enough to split stone along natural cleavage plane.

How
DENISON MULTIPRESS
serves the
HARDWARE INDUSTRY

***Economical assembly of hardware hinges** is accomplished at low cost at Jaybee Mfg. Corp., Los Angeles, California. Multipress and table cycle at rates up to 2500 an hour to pace assembly operation.*

Assembles 2500 parts an hour at **JAYBEE** Mfg. Corporation with **DENISON** Hydraulic Multipress

Building hardware is being assembled here at rates of 2000 to 2500 units an hour, depending on size. Operators have only to load component parts. An indexing fixture with air operated clamps carries parts to the pressing station . . . holds them and sets rivets.

Because of its hydraulic ram operation, the Multipress is quickly and easily set for each type and size of hinge to be assembled. And since the ram pressure is duplicated exactly on every stroke, damage to assemblies through improper loading is eliminated, cutting scrap and saving material and labor cost.

Whether your work is light or heavy, small or high production, there is a Multipress from 1 to 75 tons that can save now on expensive operations in your plant. Have your Denison representative show you how. Write Denison Engineering Division, American Brake Shoe Co., 1242 Dublin Road, Columbus 16, Ohio.

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

DENISON HydrOILics

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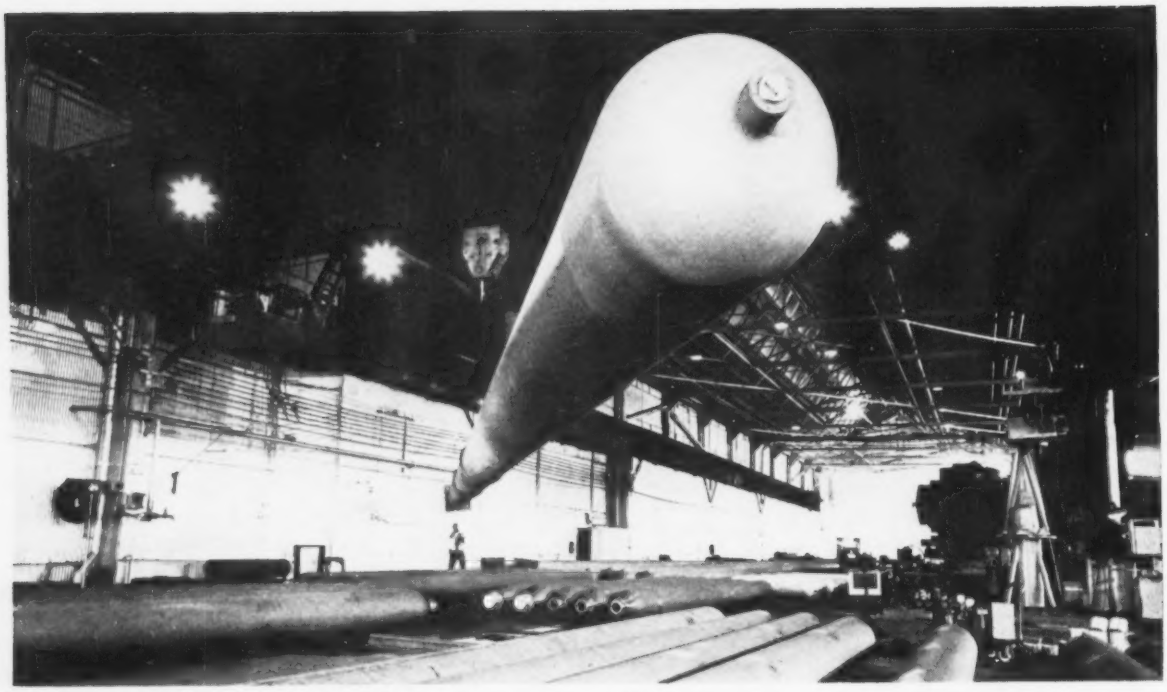


TOUGH STUFF: Steel cylinders made at U. S. Steel's National Tube Div., McKeesport, Pa., will be called on to contain cases and chemicals under pressures to 10,000 lb per sq in. Largest are 80 ft long. They are formed by piercing white hot billets into hollow forgings, or by cupping and drawing alloy plates.

New Soaking Pits

Allegheny Ludlum Steel Corp., Pittsburgh, will increase the soaking pit capacity of its Brackenridge plant with the addition of two new batteries of four pits each.

The installations are housed in a new 10,000 sq ft building built for this purpose. The setup incorporates a novel bin arrangement under the pits for removal of scale and ash with minimum handling.

AMC Dips Bodies

American Motors Corp. is using a new "body-dip" painting process that completely rust-proofs automobile bodies inside and out. It is being used on AMC's 1958 model cars.

The entire car is submerged in a tank containing a rust-preventing primer. The process has been under development by the company nearly three years. It is the first use of this system by an American automobile manufacturer, according to E. W. Bernitt, vice-president of automotive operations.

"Most of the deterioration of the body due to rust takes place from the inside out," Mr. Burnitt said.

Powdered Iron Parts

Necessity is once again the mother of improvisation. Chrysler Corp. reports powdered iron particles have proven as effective as solid steel in making a tiny part that triggers the action of the firm's TorqueFlite automatic transmission.

The compressed metal clutch was developed by Chrysler's Amplex Div. when a steel shortage left no extruded steel bars from which the part was formerly made.

Inland to Double Wide Flange Output

Inland Steel Co., Chicago, has launched a multi-million dollar expansion program aimed at doubling its output of wide flange beams.

The project, scheduled for completion the first half of 1959, will up Inland capacity for this structural shape to about 54,000 tons per month.

First in 1955—The company began producing wide flange beams late in 1955, by altering facilities originally intended for other heavy products. Initial capacity was 14,000 tons per month. Current production has been at the rate of 22,000 to 28,000 tons per month.

When the new facilities are brought in, Inland will cease manufacture of steel rails.

New Freight Law

Industrial shippers may find their choice of freight forwarders less extensive in the future.

A new law permits the Interstate Commerce Commission to deny applications for forwarder permits in areas where it considers the forwarder service adequate. Previously, the applicants weren't required to prove their service was needed.

Primary aim of the law is closer control over ICC permits.

Feeling M-i-g-h-t-y Low?

IF GRINDING WHEEL PROBLEMS HAVE YOU DOWN IN THE DUMPS, DON'T MONKEY AROUND. Switch to CINCINNATI (PD)° WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

You'll start every day with a big smile and a spring in your step when CINCINNATI (PD) WHEELS are on the job. For through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

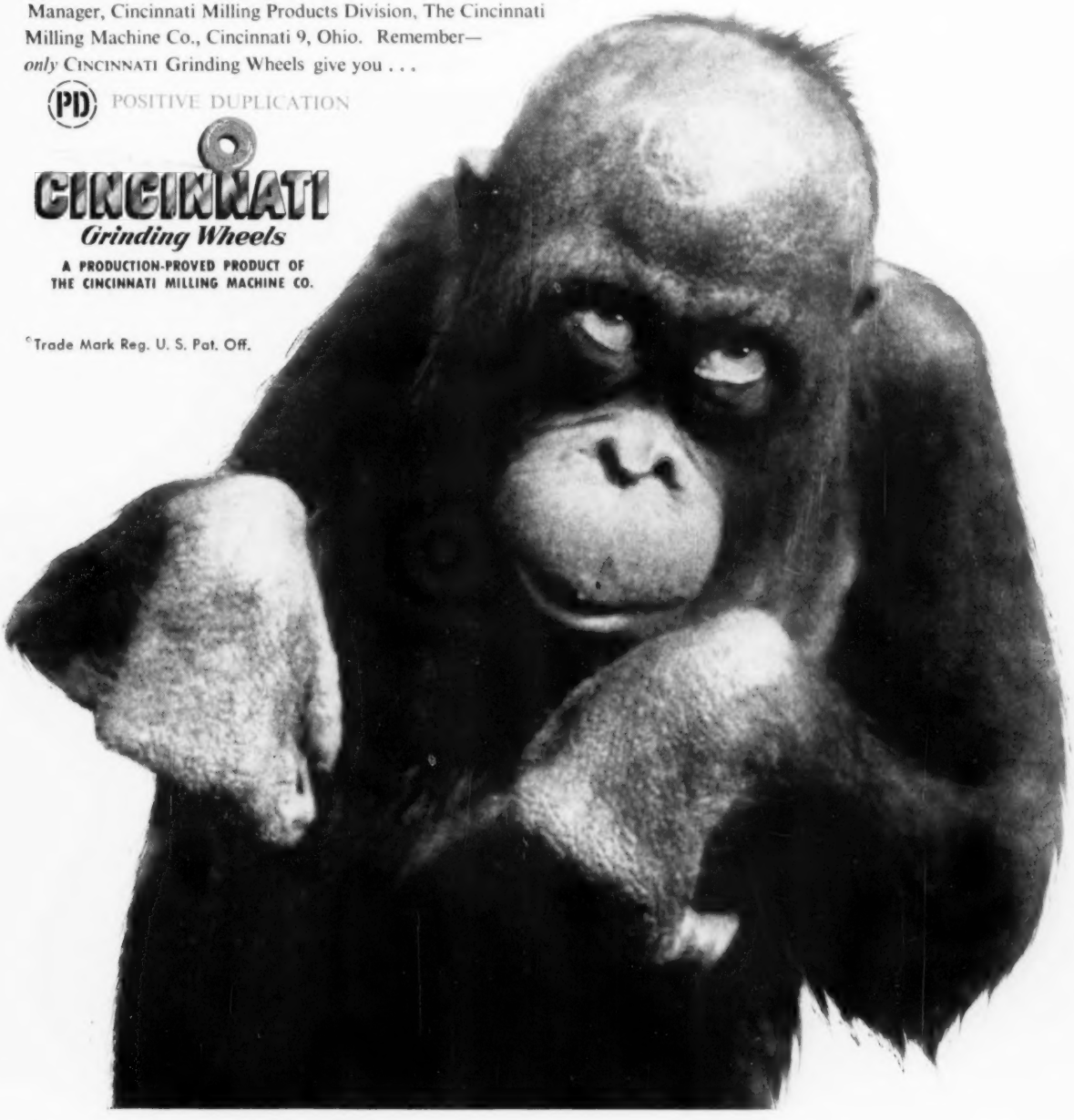
So, let us help you see the bright side of life once more. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Remember—*only* CINCINNATI Grinding Wheels give you . . .

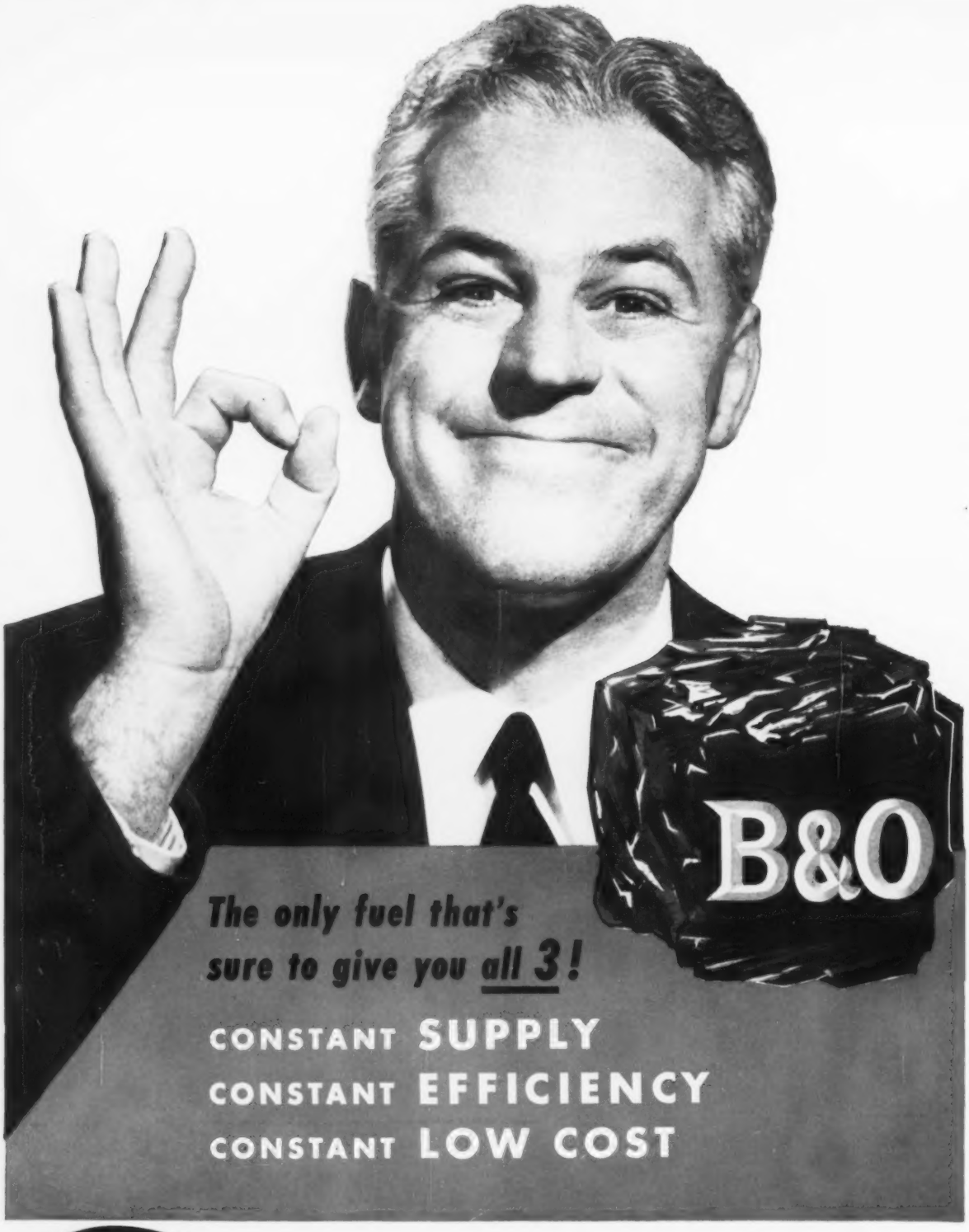
(PD) POSITIVE DUPLICATION

CINCINNATI
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.





B&O BITUMINOUS COALS FOR EVERY PURPOSE

Ask our Man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD. *Phone* LExington 9-0400

Jacob J. Jaeger

Man Behind Numerical Controls

At 48, Pratt & Whitney's Jake Jaeger is a pioneer in machine tool automation.

He sees operation of equipment by the numbers as a vast field for metalworking progress.

Much of his success is due to the freedom he has to put new ideas to work.

▪ No informed tool man will argue with Jacob J. Jaeger's belief that the future has great things in store for numerically controlled machine tools.

Jake Jaeger, who is vice president, chief engineer, and a director of Pratt & Whitney Co., Inc., has been exploring the application of numerics to machinery control since before World War II.

Starts Out Slowly—He pioneered the development of numerically controlled jig borers and grinders—big new machines that practically think and act for themselves. The integration of this system of control, he believes, is the answer to industry's demands for faster, more accurate, and cheaper production methods.

"We have to take first things first in this business and it's always wiser and cheaper to walk a little before we run," he says. "Automated machines are proving their value on the production lines of America's aircraft and automotive industries. They are no longer just expensive toolroom equipment."

Refinements Coming—"But more than anything else," he points out, "we now need refinement. The payoff will come with refined control methods to more and more types of machinery."

Jake's title of chief engineer is the one that probably fits him best. For him it encompasses work in mechanical, hydraulic, electrical, electronic, and production engineering fields—a package he calls "control systems engineering."

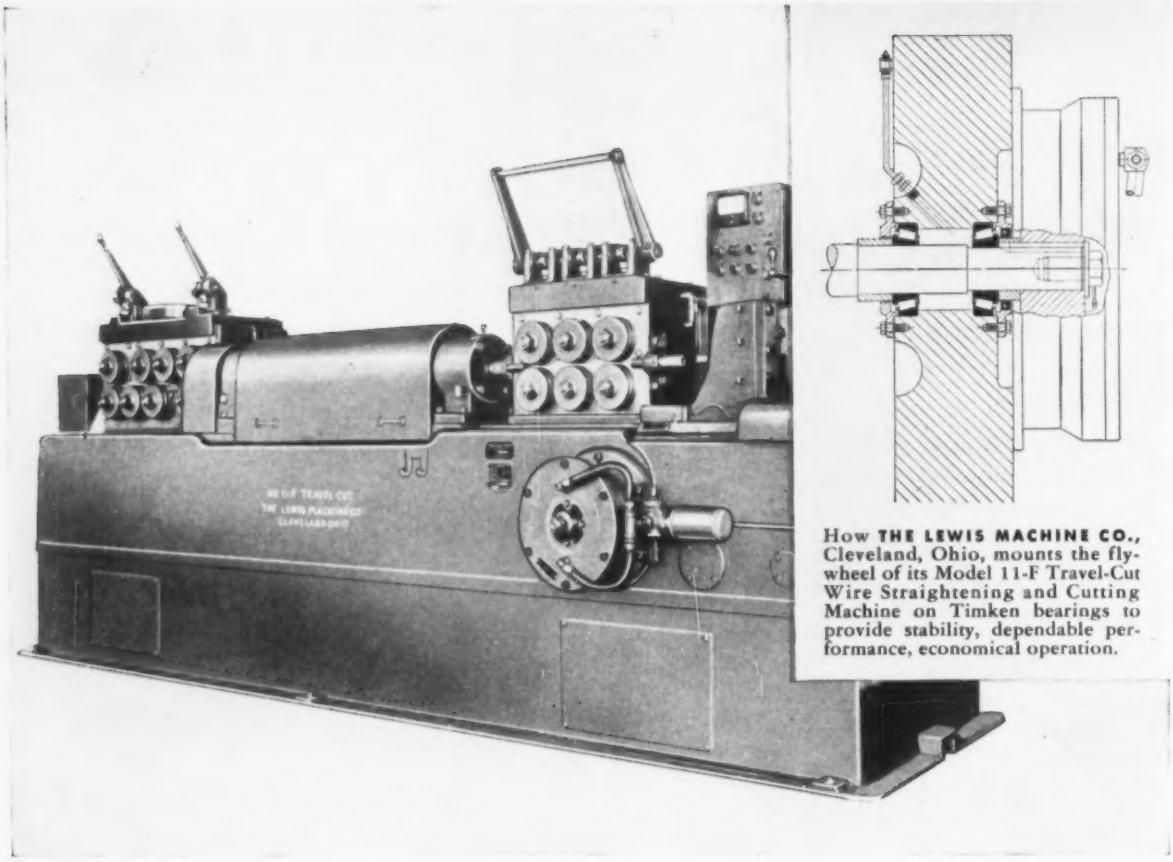
JACOB J. JAEGER: It's wiser and cheaper to go slow at first.

His Background—It was while he was associated with Massachusetts Institute of Technology as a research assistant in the 1930's that Mr. Jaeger first explored the numerical controls field. But industry was not then ready to accept a system so revolutionary.

With a degree from Drexel Institute and a master's from MIT, backed by six years of research in servomechanisms and mechanical methods of computation, he came to Pratt & Whitney in 1940. Today, at 48, Jake has spearheaded P&W's entry into the field of numerically controlled machine tools.

The men who work with Jake at West Hartford, Conn., consider him something of an engineering genius — an energetic, highly creative breed of engineer whose many ideas will show up in the tools of tomorrow.

Demand Grows—Under his guidance the company developed and, early this year, shipped its first automated jig borer. Now the company is whittling away at a several million dollar order backlog for numerically controlled hole grinders, jig borers, and rotary tables.



How **THE LEWIS MACHINE CO.**, Cleveland, Ohio, mounts the flywheel of its Model 11-F Travel-Cut Wire Straightening and Cutting Machine on Timken bearings to provide stability, dependable performance, economical operation.

How TIMKEN® bearings keep flywheel stable on automatic wire straightening and cutting machine

TO take the varying loads of automatic wire straightening and cutting, the bearings in this Lewis Model 11-F Travel-Cut have to be extra tough and virtually friction-free. That's why The Lewis Machine Company uses Timken® tapered roller bearings for the flywheel, feed rolls and drive—38 in all. Timken bearings keep the flywheel stable and rotating freely, position gears and feed rolls accurately even under heavy loads.

EXTRA LOAD-CARRYING CAPACITY. Full line contact between their rollers and races gives Timken bearings extra load-carrying capacity. Tapered design lets Timken bearings take *both* radial and thrust loads in any combination. The flywheel doesn't wobble. Gears and feed rolls *stay* in position.

PRACTICALLY FRICTION-FREE PERFORMANCE. Because they're geometrically designed to roll true, and precision-made to live up to their design, Timken bearings virtually eliminate friction. They run smoother, last longer.

NO SHOCK PROBLEMS. Because they're case-carburized, Timken bearings' rollers and races have a hard, wear-resistant surface over a tough, shock-resistant core. They *absorb* shocks, reduce maintenance.

That's why it pays to specify bearings trade-marked "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

See the first Timken Televent hour, in color, "Eleven against the ice—story of the Antarctica Turnpike". NBC-TV, Monday night, Sept. 23.

Business Toughens Its Defense

Big business is learning that it can no longer let critics' charges go unanswered.

The old soldier's axiom that an offense is the best defense, is paying off.

■ The recent show of strength by U. S. Steel's Roger Blough and his management team at the Senate committee hearings on steel prices is a prime example of what business can do to defend itself if it takes time to get set.

In the past, industry has often come out second best in these public bouts. The pros in the art of swaying public opinion had things pretty much their own way.

Reuther's Maneuver — Big business is regarded as fair game by politicians and union leaders. One case in point is the offer by UAW's Walter Reuther of one or two bargaining "maybes" in exchange for an auto industry promise to reduce by $100 the price of 1958 cars.

It was a thinly-veiled bid to place the blame for inflation in the lap of management — to put management on the defensive. He figured he couldn't lose, regardless of management's reaction.

Counteroffensive Works — Mr. Reuther reached into his bag of tricks for that one. In days gone by it might have succeeded. But this time the automakers weren't caught off guard. Ford, Chrysler, and General Motors came back fast with statements to the press and open letters to Reuther. They countered Reuther's offensive with one of their own.

Steel Is Ready—Mr. Blough and his group worked for weeks preparing answers to every conceivable argument that might be thrown at them by Sen. Estes Kefauver's committee. Mr. Blough took the ball and ran with it from the beginning. Sen. Kefauver ran a poor second.

It's a matter of conjecture whether the senator will call other steel companies to testify now. If he does, chances are he will find them just as well prepared as was U. S. Steel.

The point is that industry is more alert to the need for publicity preparedness. Coming out of your corner swinging is not enough, even if truth is on your side. You have to be in condition.

Moonlighting: It's Growing

One in 17 Do It—The practice of moonlighting, or holding down two jobs, is on the increase. Even if your company is small, chances are you have a few employees who pin another company's badge on their shirts after ringing out at your plant.

The Bureau of Census reports that in 1950 there were about 1.8 million moonlighters in the U. S. Last year, there were about 3.7 million.

Frowned On—A survey by The Associated Industries of Cleveland reveals that most companies in that area have no policy regarding workers holding down a second job, as long as efficiency doesn't suffer. But generally, most managements frown on the practice.

One firm has an employee with five children who works at a second job. The company says it doesn't blame him for trying to increase his income.

UAW Forbids—Strongest opposition to moonlighting comes from labor itself. The United Automobile Workers is dead against it.

You can suspect an employee of being a moonlighter if he shows signs of laziness, sleeping on the job, tardiness, absenteeism, or poor work.

More Dollars Go Abroad

Sudden Jump—You may be surprised to learn that long-term private investments to foreign countries are increasing at an unprecedented rate.

Total outflow of new funds, including portfolio and new investments, shot up to $2.6 billion last year from a previous 10-year average of $1 billion, U. S. Commerce Dept. reports. Reinvestment of earnings, another major source of funds, jumped to $1 billion in 1956, or $400 million over the 1946-55 average.

Unofficial Tallies—Some sources estimate that capital spending abroad by U. S. investors last year was closer to $5 billion, since Dept. of Commerce figures measure only the net flow of private investment. Compare this to the $1.8 billion federal economic aid program in 1956.

Why Lincoln Located at Wixom

A Score of Other Towns Were Passed By

The little town of Wixom, Mich., has a lot to offer as a site for Lincoln's new plant.

But since the decision was made, the picture has changed. Would Lincoln make the same choice today?—By H. R. Neal.

▪ Lincoln division of Ford Motor Co. is busily producing 1958 models of Lincoln and Continental automobiles in a new multi-million dollar plant near Detroit.

The huge plant is Lincoln's only assembly facility. It is not only one of the most modern assembly plants in the auto industry, but assembly methods employed are new to the Big Three. Lincoln prefers to wait until Oct. 22 before releasing any details of the plant and its products. They are linked that closely together.

Why Wixom?—While unable to talk about the "what" and "how" of goings-on in the plant, there is a story in "why" the plant is located in Wixom, Michigan, a sleepy little ex-farming hamlet some 30 miles west of Detroit. It is a story of advance planning and careful selection.

But even the crystal ball gazers are sometimes confronted with a frosted glass that makes predicting a hazardous business. Is it possible the "seers" needed Windex on the day they settled for Wixom?

Rivalry Between States—In recent months a long smoldering feud between Michigan's manufacturers and the state's Democratic governor G. Mennen Williams has erupted over the state's tax structure and the high cost of doing business from within Michigan boundaries. There has been across the border sniping between the Michigan governor and the governor of Indiana. Ohio has exploited the controversy, using it as a lure to woo industries planning Michigan facilities to the Buckeye state instead.

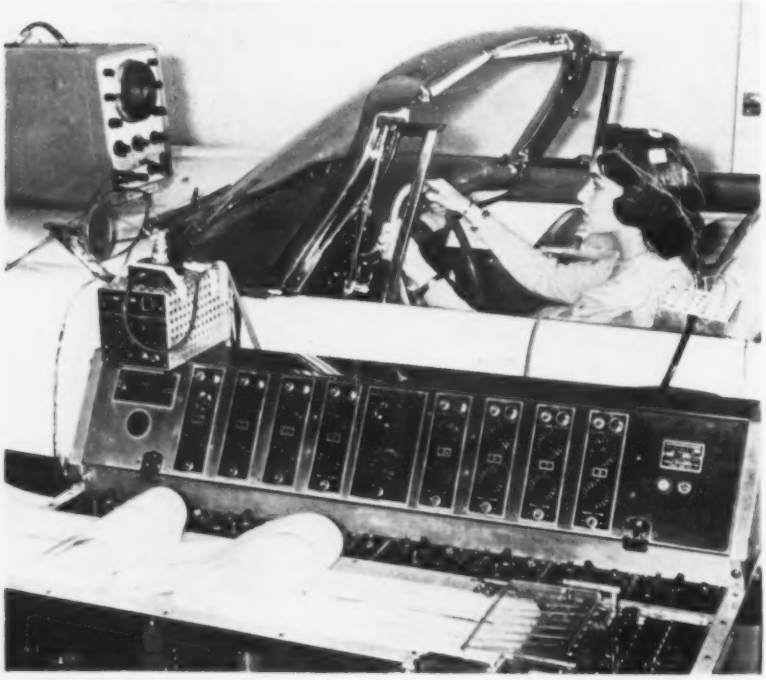
In the midst of this, then, why did Ford Motor Co. decide to locate in the "high rent district?" The decision "where to locate?" seldom hinges on a single factor such as taxes. The Lincoln decision was based on an analysis of the "total" picture as it applied to needs and anticipated benefits.

Points to Consider—Basically, the picture grew from exhaustive studies in three areas: transportation, state tax costs, and availability of a stable and qualified labor force.

Unlike other Ford divisions, Lincoln was planned as a single plant division. As a result, the possibility of combining general office and plant functions was given early consideration.

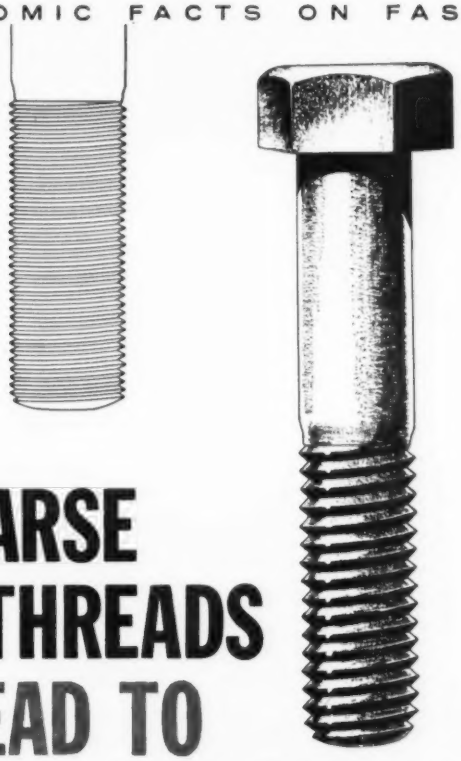
Transportation Costs—Inbound and outbound transportation costs had to be considered separately and together. Some 16 cities in four

To Check Driver Alertness



BRAINWAVE: An electroencephalograph is used by Harper Hospital, with Chrysler engineers, to test driver drowsiness. Tests indicate that a definite dropoff in alertness occurs after only 1½ hours steady driving.

ECONOMIC FACTS ON FASTENERS



COARSE THREADS LEAD TO LOWER ASSEMBLY COSTS

- **Fasteners with coarse threads assemble faster, easier**
- **Make a stronger joint, too**

Big savings hide in small details . . . in the threads of bolts, nuts and cap screws, for example.

Coarse threaded fasteners tighten with only two-thirds the revolutions needed for fine threads . . . speeding assembly. Coarse threads enter nuts or mating holes with less tendency to cross thread when not truly positioned. Often this ease of starting is a decisive production advantage. Even in *handling*, there's an advantage. Coarse threads need less "babying" to avoid damage.

• **More strength.** With greater resistance to stripping, coarse threaded fasteners can be tightened more for a stronger assembly.

Yes, even with standard fasteners there are ways to save money and improve quality . . . by looking at your products through the eyes of an RB&W Fastener Man. His service is available just for the asking. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

R B & W
112th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Spin-Lock Nuts dig in to stay tight

The photograph shows the many hardened "anchors" on the flange of a Spin-Lock Nut. These "ratchet-action" teeth require 20% more torque to loosen than to tighten. They bite in as the nut turns down on its seat. Like Spin-Lock Screws, these nuts can stay put in products subject to vibration and cyclic temperature variations. Send for bulletin.

High strength bolts save costly crane

At one company's plant, a large, heavy-duty crane had deteriorated due to rivets loosening. Replacing with new rivets was no permanent answer, but RB&W high tensile bolts were.

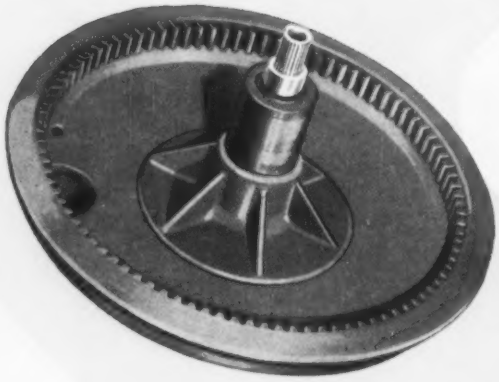
Used with hardened washers, these RB&W bolts clamp members together so tightly, no slipping into bearing takes place, holes are reinforced against fatigue, and connections become vibration-proof.

Assembling heavy duty equipment with RB&W high strength bolts in the first place can avoid such problems and create more satisfaction with the product.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY

Unit saves 2¼ man hours on each shaft machined from

OSTUCO TUBING



VERTICAL TRACTION SHAFT

Unit Crane & Shovel Corporation, Milwaukee, "lowered the boom" on costs by using OSTUCO tubing for vertical traction shafts in its line of heavy construction equipment. By eliminating a center-boring operation, Unit saved 2¼ hours machining time on each shaft.

OSTUCO tubing has tremendous strength to absorb the constant shock and strain to which Unit equipment is normally subjected and machines easily to precision tolerances.

Cash in on the economy of OSTUCO'S unique "Single-Source-Service"—complete tubing facilities "under one roof"—by contacting your nearest OSTUCO sales office.

OSTUCO TUBING

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CANADA, RAILWAY & POWER ENGR. CORP., LTD.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY 225 Broadway, New York 7, New York

Automotive Production

WEEK ENDING		CARS	TRUCKS
Sept. 7,	1957*	90,709	18,330
Aug. 31,	1957	118,563	20,815
Sept. 8,	1956	47,827	14,655
Sept. 1	1956	58,166	18,705
TO DATE	1957	4,482,031	775,197
TO DATE	1956	4,091,890	787,071

*Preliminary. Source: Ward's Reports

states were in contention with the lowest freight rates.

Michigan had Detroit and Grand Rapids. Ohio offered Tiffin, Youngstown, Canton, Zanesville and Springfield. Indiana candidates were Richmond, Fort Wayne, Indianapolis, Lafayette, Terre Haute and Elkhart. In Illinois it was Chicago, Peoria and Champaign.

Weighing the Factors—Two factors helped limit the search to these states. Parts suppliers to Lincoln are primarily concentrated in these states. Most are within 150 mi of Detroit.

Second was Lincoln's projected sales distribution for 1960. According to the forecast, 26 pct of sales would come from the central states of Michigan, Indiana, Ohio, Kentucky, western New York and Pennsylvania, and West Virginia.

Labor Is Plentiful — Detroit showed the lowest inbound freight costs. Indianapolis presented lowest outbound freight rates.

Illinois, which has not entered too prominently into the Michigan-Ohio-Indiana tax squabble, was able to remain in contention by offering the lowest state tax.

Almost any of the areas under consideration would have been able to supply a stable and qualified industrial work force.

Tiffin Rates Best—When all of these factors were thrown into the site selection equation—transportation, taxes, labor—Tiffin, O., emerged as the logical site. Tiffin was not superior in any particular area, but it offered the advantage of lower over-all costs. Detroit was a fifth-best choice, preceded by Ft. Wayne and Richmond, Ind., and Springfield, O.

There was still one factor to be considered before the final eliminations. Day to day relations with the Ford Motor Co. central staff and with other divisions was a must. Putting the plant in Tiffin meant Lincoln would require a separate staff in the Detroit area to handle the liaison duties.

Estimates placed the cost of maintaining this extra office at $1,000,000 annually, or more. The Tiffin location offered a savings near $5-600,000.

Congestion in Dearborn — Further studies of Detroit showed employee willingness to drive 15-20 miles to work each day. This was an important consideration for location near, but not in, Detroit.

Wixom, Mich. offered the advantages sought. Size—325 acres; good road and rail transportation—a super-highway, near completion, goes by the front door of the plant; excellent topography—natural drainage; and adequate utilities. Wixom got the nod.

Organization Shifts — A recent turn of events, if foreseen, might have altered Lincoln's site selection. Lincoln became an independent division of Ford Motor Co. in 1955. Prior to that time it was part of Lincoln-Mercury division. Continental was merged with Lincoln earlier this year when that division folded.

Just last week another wedding ceremony between Lincoln and Mercury divisions took place. Once again the two were merged into one. The wedding is evidently one of economic compulsion, and not necessarily of convenience.

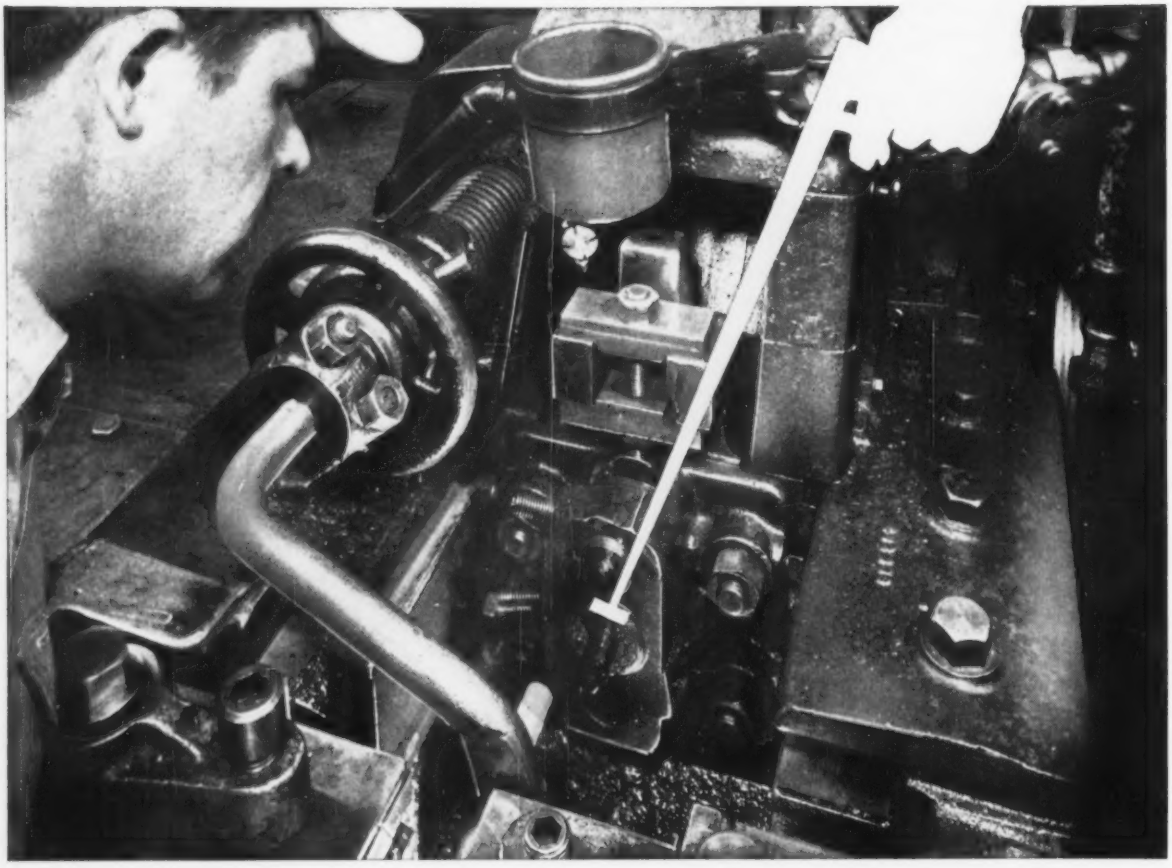
Possible Profits, But—Consolidation of staff functions, a logical and likely evolvement, would cut down overhead. Manufacturing staffs should remain stable. This, coupled with a new product already in production, could mark the beginning of profitable operations for Lincoln cars.

The question now arises whether Lincoln, stripped of the need for a combined central and manufacturing staff, would have made the same decision in locating its plant among the hills of Wixom.

THE BULL OF THE WOODS By J. R. Williams

MOTHER MACK'S SHOP LUNCHES PUT UP FOR ANY SHIFT
IS MY FACE RED-- WITH KETCHUP !
WAIT A MINUTE, HERE! IS THAT MY MOUTH AND YOUR HANDS, OR IS IT MY HANDS AND YOUR MOUTH WE'RE FEEDIN' HERE?
MOTHER MACK'S BEAUTY SHOP-- SIT DOWN AND GET A KETCHUP HENNA--BECOME A MUSTARD BLOND, A COFFEE BRUNET, OR A STRAWBERRY ROAN!
WHO'S BEEN EATIN' ON MY SAMWICH?
KEEP IT OUTA MY MOUTH!
I'M GETTIN' TO LIKE SUGAR IN SOUP--BUT DON'T SPILL ANY MORE! IT'S JUST RIGHT, NOW!
HEROES ARE MADE-NOT BORN
J.R.WILLIAMS
1957 by NEA Service Inc.

A Touch here does so much



COOL PROFITS FROM HOT HEADS

A touch of 'dag'™ 200 on the punch that sinks hexagonal recesses in steel screwheads increases efficiency 40%, doubles production, and improves quality. Two operations and a bulky machine are eliminated, and 42 square feet of floor space gained per machine. Life of the hex punches is extended over 500%.

Before using 'dag' 200, the die in the hammer head seized and pulled out when punched into the white hot blank, resulting in costly rejects and downtime. The unique properties of 'dag' 200, a dispersion of molybdenum disulfide, keep the hammer slamming 2,500 blanks per die — six times more than before. Three hours' downtime is saved per die, and only two-and-a-half gallons of 'dag' 200 are needed to produce 21,000 units.

This is only one of the many Acheson colloidal dispersions which keep things moving fast in hundreds of industries. Talk with your Acheson Service Engineer soon, and write for Bulletin 426, Metalworking Applications. Address Dept. IA-9.

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Inflation Getting Close Watch

Tighter Credit Due If Prices Advance

FRB wants business and individuals to check price rise by spending less and saving more.

But if present controls dry up money supply, look for credit easing.—By G. H. Baker.

▪ Government money experts are keeping a close watch on inflation tendencies in different parts of the nation. While there's not nearly as much steam in the boom as there was 12 to 18 months ago, advancing prices are still being viewed with suspicion in Washington circles. Any major forward surges in costs and prices will undoubtedly bring on a further tightening of money rates.

The Federal Reserve Board is sticking to its belief that the best way to check the rise in prices is for businessmen and individuals alike to slow up their rates of spending and increase savings.

Dollar Pumping—What's going to happen when the government controls over spending—such as high interest rates—begin to "bite in" and put some serious dents in spending and expansion programs?

Bill Martin, the chairman of the Federal Reserve Board, says he's keeping a close watch on the nation's money supply. If it shows signs of drying up too fast, he's prepared to order an immediate lowering of interest rates.

Labor Halts Drive

Labor has temporarily shelved its plans for a big organizing drive among office workers. The campaign had been set to get a heavy promotion push this fall. But doubts and uncertainties raised among the rank and file by the Senate rackets investigators have caused labor leaders to put "on ice" their long-range plans for bringing the nation's 13 million unorganized white collar workers into the AFL-CIO fold.

The drive is not by any means abandoned. Stanley Ruttenberg, AFL-CIO research chief, says organized white collar workers will one day become the largest single organized bloc of workers in the United States.

Main Target—What the AFL-CIO chiefs have in mind as their prime target are the large blocs of white collar workers in industrial locations, insurance companies, banks, and finance companies. There are about 13 million.

Up to now, there are only about 3 million organized white collar workers, chiefly newspaper reporters, actors, teachers, postal clerks, and retail workers.

Trade With Red China?

Trade with Red China? Not this year, certainly, but an easing of prohibition on U. S. trade with China could come about next year. A pro-China bloc in the State Dept. is steadily hammering away at the theme that "the U. S. must follow Britain's lead," and "it is in our own best interests to sell the Chinese what they need and want."

In Congress, too, there's a belief that trade with China would prove to be a welcome business stimulant: Machinery of all description is needed by the Chinese.

Congress Meets Determined Man

The Trend—It's becoming almost routine in the Eisenhower Administration for men appointed to important political jobs to sell their stock in companies doing business with the government. Former Defense Secretary Wilson and other high-ranking officials in Ike's official family have voluntarily sold millions of dollars worth of securities in order to avoid any possible conflict of interest between their public trusts and their private financial affairs.

The Exception — But senators conducting a routine hearing on an Eisenhower appointee to an important Pentagon position were flabbergasted recently to hear a candidate declare he would not sell his stocks as a condition to holding office in the government. Dr. Paul Darwin Foote, named by Ike to serve as Assistant Secretary of Defense (Research and Engineering) was asked in routine fashion if he intended to sell his stocks in firms doing business with the government. No, replied Dr. Foote, he didn't think so.

The Result—Gasps from the senators. How's that again?

Dr. Foote, a former vice president of Gulf Oil and before that a physicist with the National Bureau of Standards, didn't win Senate confirmation.

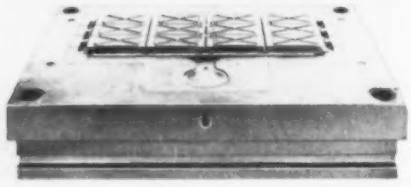
However, Ike gave him a recess appointment. This will keep him in the Pentagon at least until January.

Teamed up to lick a tough job ECONOMICALLY!

Latrobe's . . . VDC and pre-hardened VISCOUNT 44

Die Casting Die Steels

Rack for assembling electronic parts (approximately 2 feet long by 1 foot wide and weighing 2.05 pounds) produced for Northrop Aircraft, Inc., Northrop Div., Hawthorne, Calif.



Harvill Corp., Los Angeles, Calif. had to produce this part DEAD FLAT at a minimum cost . . .

The problem of producing this die casting die at a minimum cost was a natural for Latrobe's VDC and Viscount 44 die casting die steels.

The die parts, not affecting the critical flatness, were made of Latrobe's VDC die casting die steel, an air-hardening, 5% chromium die steel possessing excellent machinability and superior resistance to wash and heat checking. For the die parts demanding dead flatness, the use of Latrobe's Viscount 44 prehardened die casting die steel eliminated all possibilities of warpage from heat treatment and subsequent costly grinding time to correct warpage. Die surfaces were machined to exact size! Heat treat was eliminated!

Latrobe's Viscount 44 is an air hardening, 5% chromium die steel containing 1% vanadium that imparts excellent physical properties for hot work applications. Furnished prehardened, in a range of Rockwell C 42-46, Viscount 44 is practical to machine in its prehardened form as a result of the alloy sulphides it contains. Years of experience in the production of DESEGATIZED® steels have made it possible for Latrobe to uniformly distribute these free-machining sulphide additives throughout Viscount 44.

Use Viscount 44 for your next critical die casting application. Your nearest Latrobe representative will be pleased to give you complete data . . . and warehouse stocks are available for immediate delivery.

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STEEL COMPANY
Main Office and Plant: Latrobe, Pa.
Branch Offices and Warehouses Located in Principal Cities

Plane Cuts Sharpen Competition

But Builders Expect Usual Share of Market

Air Force tells planemakers and their suppliers the race for orders will be keen.

West expects to get half of the $7 billion for aircraft spending in 1958.—By R. R. Kay.

▪ How will the Air Force budget cuts affect the aircraft industry and its thousands of subcontractors on the Coast?

Briefly, here's the official Air Force position as outlined by Air Force Secretary James H. Douglas and Lt. General C. S. Irvine, USAF Deputy Chief of Staff, Materiel:

Historic 50 Pct—National spending for aircraft and related products will run about $7 billion for fiscal 1958—down $.5 billion from last year's record high. But the industry on the West Coast will continue to get its historic half of the business.

The new trend toward expenditure control is a significant factor. "But," Gen. Irvine said, "it has been publicized all out of proportion to its real effect."

More Competitive—The General urged that companies take a real hard look at their management and engineering practices and at their production techniques. Competition for future business will be keen. That applies not only to major companies, but also subcontractors.

More Aluminum On Way

Harvey Aluminum's new reduction plant at The Dalles, Ore., will be turning out primary aluminum early next year. The completed facility will have an annual capacity of one million pounds.

The company will get its alumina from Japan. And it expects to use more than 100,000 tons per year.

The plant, 82 miles east of Portland, Ore., will be a welcome newcomer to the Pacific Northwest's economy. It will open up hundreds of new jobs to the tune of a multimillion dollar annual payroll.

Power Brownout

The Pacific Northwest's chronic industrial "brownout" began September 1. At the same time, five of the largest power suppliers promised to spend $1 billion on expansion within the next 12 years.

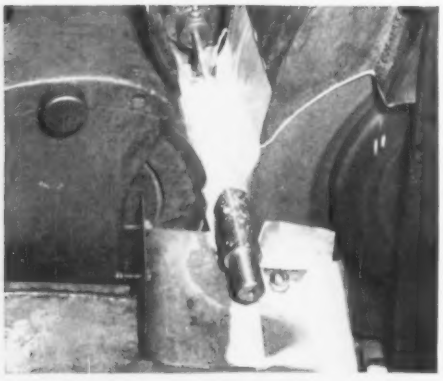
The annual cutback in interruptible power hurts mainly the electroprocess industries. It won't cause much job dislocation, but will reduce production in most of the plants.

The "brownout" results from late-summer low-water conditions behind the dams that generate electricity for the power-hungry area. Affected businessmen have learned to live with the situation. But that doesn't necessarily mean they're happy with it.

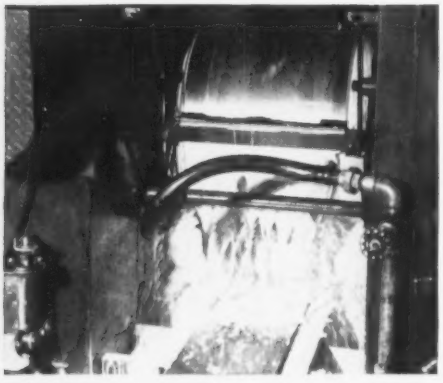
Battered but Ready for More

MOVING AHEAD: Better design of pilot helmets is aim of testing with aluminum head at Los Angeles Div. of North American Aviation. Impacter is swung against helmet and force recorded electrically.

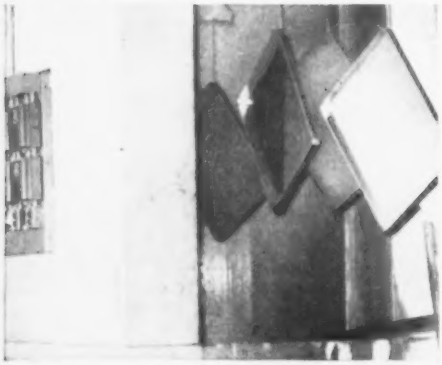
CUTTING



GRINDING



ROLLING



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REGULAR • Sunoco® Emulsifying Cutting Oil (S.E.C.O.) is a low-cost general-purpose oil for most cutting and grinding applications. Operators like S.E.C.O.—it makes clean emulsions that stand the gaff of long production runs. Its superior rustproofing ability protects both machines and work.

HEAVY-DUTY • S.E.C.O. HD emulsions have film strengths more than twice those of regular emulsifying oils. This extra strength, plus high oiliness, gives you a low-cost way to machine today's tough alloys and "hot" jobs.

SPECIAL • Custom grades of Sunoco Emulsifying Cutting Oil are made to meet unusual hard-water conditions. Other special formulations are used in rolling steel, brass, aluminum . . . in hot and cold washing . . . in rustproofing . . . and in many other applications.

FOR FULL INFORMATION: Call your Sun representative or write for Technical Bulletin 16 (S.E.C.O.) and Technical Bulletin 11 (S.E.C.O. HD). Write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-9.

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INDUSTRIAL PRODUCTS DEPARTMENT

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Small Orders Take up the Slack

Big Buying Off, But Business is Still Good

Almost all builders will admit that business is below what had been expected.

But buying is still considered pretty good.

Peak is no measure of "normal business level," says machine tool man.—By E. J. Egan, Jr.

▪ Almost all machine tool builders admit new orders this year haven't been as heavy as they expected. But not one will admit his industry—or his company—is near a distressed condition.

Cutbacks in military aircraft production schedules have hurt some builders. Others have suffered from a reluctance in the auto industry to buy new machine tools.

Orders Coming In—But automobile and aircraft aren't the only markets most builders have. Both large and small machining facilities in less publicized areas of metalworking are still buying new machines every day.

One prominent builder of general purpose machine tools looks at the current business picture this way: "Some people seem to delight in trying to make the machine tool industry look bad. To back up their dire predictions, they cite figures to show how much business has fallen off from some recent peak.

Peak Not Normal—"What they fail to point out is that a lot of these peaks have been all-time highs for our industry—not representative of what I'd consider a normal business level.

"There's no denying that we've been eating plenty high on the hog for a number of years. But don't forget this: Most of us learned a long time ago how to make a profit and pay dividends at one-fourth the level of business we've enjoyed in recent times.

Anything But Desperate—"Sure, we may have to knock off overtime work now and then, but we still open up for business every day and we're getting orders every day, too. The situation is anything but desperate."

In general, other industry leaders echo this realistic view. Most are well prepared to weather far worse trouble than represented by the new order decline of the past year.

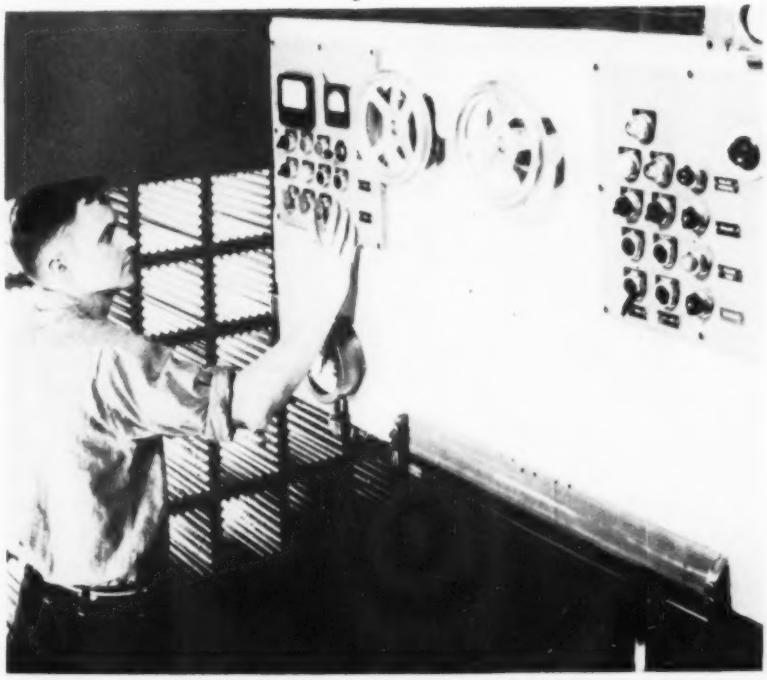
Many builders expect the order trend to turn upward this fall.

Miniature Shows

Miniature machine tool shows, in the form of open-house demonstrations by machinery distributors, seem to be growing in popularity. Mill Supply and Machinery Co., St. Louis, will hold its second such affair October 9 through 12.

Delaware Valley Machinery Co., Philadelphia, will hold a similar show for an expected 2000 visitors October 8 through 12.

Canton Tool Drills Deep



DEEP: Each thrust of the Canton Tool "deep hole driller" put 13/16 in. hole in a block of stainless steel 18 in. thick. The machine was made for Westinghouse Electric Corp. for work on its new nuclear energy plant.

INDUSTRIAL BRIEFS

For Farm and Shop—Hercules Powder Co., Wilmington, Del., is building facilities to produce 10,000 tons per year of urea at its California plant. The new facility will represent further diversification of nitrogen products. It will allow Hercules to supply urea solutions for agricultural and industrial purposes. Completion is scheduled for late 1958.

Introducing Byloy W2—A new electric furnace quality alloy steel has been introduced by A. M. Byers Co. of Pittsburgh. Byloy Grade W2 is a high strength, fatigue and abrasion resistant alloy. It is a combination of manganese, molybdenum, copper and boron alloyed with steel. Byloy is available in hot-rolled plates and bars. It can be supplied heat-treated to the customer's required hardness range.

Maple Leaf Branch — Pennsalt Chemicals Corp., Philadelphia, has formed a wholly owned subsidiary in Canada. The new component will be known as Pennsalt Chemicals of Canada, Ltd. W. B. Billingsley has been named vice president of the subsidiary and resident manager of its operations.

Business in Byproducts—Facilities for the production of a new granulated ammonium sulfate material have been installed at the Fairfield Coke & Chemical Works of U. S. Steel's Tennessee Coal & Iron Div. New plant will produce an improved nitrogen fertilizer for Southern farmers and gardeners.

Casting Timetable Aside—Work is proceeding ahead of schedule on the construction of the new malleable foundry at Link-Belt Co.'s Ewart plant in Indianapolis. The foundry will incorporate the latest techniques and mechanization in foundry practices. It is expected to be in operation during December or early January, 1958.

Midnight Oil Will Burn — Gulf Oil Corp., Pittsburgh, will expand its aid to higher education. The six-fold program will increase grants to colleges and universities and broaden scope of other contributions. New features include scholarships to children of employees, an alumnus gift-matching program, increased financial help to colleges, their faculties and selected departments.

Kilowatts on Wheels—The Puget Sound Power & Light Co. is using the mobile substation, based at Renton, Wash., to bypass permanent substations while regular equipment is being serviced and maintained. The trailer mounted electric power substation was built by General Electric Co. This unit has a capacity of 9000 kilovolt amperes, enough electric power to supply the residential needs of a city of 22,000 people.

Hot TV Show — Republic Steel Corp.'s Buffalo plant now has closed circuit television at its new 14-in. bar mill heating furnace. The TV camera and receiver is part of a major overhauling and modernization of the plant's biggest finishing mill. Program included installation of a 2000-ton heating furnace. Offsite construction of the furnace saved the plant over two months in down-time.

Permission Granted—Gulton Industries, Inc., has been awarded a license for the production of a Laminagage under patent rights held by General Motors. The Laminagage is a production tool used for the checking of platings and coatings on metals and other electrically conductive materials. Licensing agreement between the two companies is non-exclusive.

Keeping in Touch—General Electric is expanding its leased telegraph network. It will provide more efficient service to 421 plants and offices now linked by 91,000 miles of circuits. New switching centers in Atlanta, Ga., Ft. Wayne, Ind., and Schenectady, N. Y., will have double the capacity of the present centers.

Slash Slush Damage — An improved rust inhibitor rendering salt-slush from wintry streets non-corrosive to passing vehicles has been developed by Calgon Co. New Formula Banox is effective in curbing metal loss caused by salt brine corrosion. Product reduces salt brine corrosion by 90 to 95 pct. It is odorless and non-toxic. Also, harmless to skin, animals, plant life, paint and automobile finishes.

Drill Team — Straight Shank Dupont Nylon Drill Sleeves are now available from James Products Co., Mentor, O. The product reduces drill breakage, scored spindles, and damaged chucks. This sleeve will break under sudden shock and leave the drill intact. Its ability to withstand heavy feeds without distortion or drill slippage equals or exceeds that of metal sleeves.

Turn On the Heat—The Timken Roller Bearing Co. will install a $5 million vacuum furnace. The furnace will be located north of the present melt shop. It will be incorporated in the shop by extending the charging section of the melt shop building an additional 63 feet. Capacity of the furnace will be 5 million lbs per year or about 200 tons per month. Twenty-four ingots can be produced by the new furnace.

"No, no, Gogswell! Get a little more whine in your voice!"

Like slipping an extra layer into a 7-layer cake

TIGHT QUARTERS

at Curtiss-Wright's South Bend plant (Utica Bend Division) created a rough installation problem. McGraw mechanical erection men had to fit in heavy-tonnage machinery for overhauling jet engines, but the ceiling was too low for conventional crane operation, and the plant had no overhead crane. To solve the problem, the McGraw team brought in a standard Tourna-Crane, reduced the boom height, and jockeyed the heavy, bulky equipment into place . . . like slipping an extra layer into the Sunday cake!

McGraw men, machines, methods and materials have established an outstanding record of meeting and conquering tough problems of industrial construction and mechanical erection for the major firms in American industry. A McGraw engineer would be happy to discuss your construction or installation problems with you – no obligation, of course.

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makes a lot of sense to me!

Needed-Rush!
85 feet; 3½ inches
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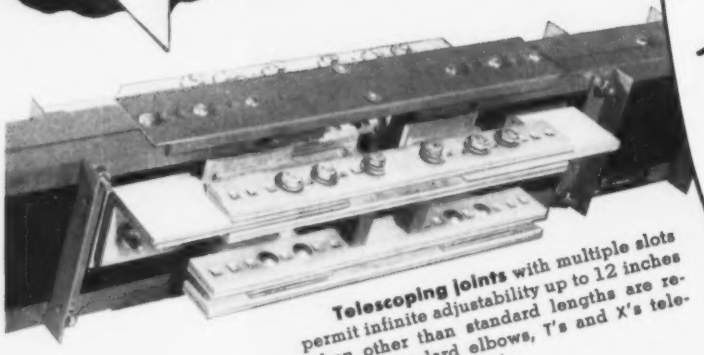

Telescoping joints with multiple slots permit infinite adjustability up to 12 inches when other than standard lengths are required. Standard elbows, T's and X's telescope up to 6 inches!

Fast delivery because any length requirement can be met with standard 3, 5, 7, or 10 foot lengths, plus telescoping joints

Completely adjustable after it's hung. For example, if two ends terminate 6½ inches apart, connection can still be made with a telescoping joint

Faster to Install . Above photo of fixed joint shows simplicity of design — symmetrical ends — less bars per phase — fewer connections — outward-facing captive bolts

Totally enclosed for safety —at no price premium. No de-rating necessary. Square D's design eliminates need for ventilation

MORE DESIGN FEATURES

Thinnest cross-section available! Tight spots, pipes and structural members present less problems

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NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

J. W. Robinson, named president, Leeds & Northrup, Canada, Ltd.

D. A. Levine, elected vice president, Great American Industries, Inc.

P. H. Adams, appointed vice president, public relations, U. S. Steel Corp.

E. P. Gillane, president, Pratt & Whitney Co., has been named executive vice president, industrial operations, Penn-Texas Corp.

Edmund Sylvester, elected president, The American Ship Building Co., Cleveland; **H. P. Ladds,** elected chairman, executive committee.

G. W. Morris, named superintendent, Wire Dept., Bethlehem Pacific Coast Steel Corp., Los Angeles plant.

R. H. Filsinger, Jr., elected vice president, sales, Vanadium Corp. of America.

E. M. Grady, named sales manager, mill products, Western Brass Mills Div., Olin Mathieson Chemical Corp.

D. F. Darney, appointed manager, Stainless Steel Products Div., U. S. Steel Supply Div., Chicago headquarters.

J. M. Mele, appointed Philadelphia district manager, Bay State Abrasive Products Co., Westboro, Mass.; **L. M. Price,** appointed abrasive engineer, Minnesota, N. Dakota and S. Dakota.

H. Winkhaus, appointed president, Mannesmann AG, Dusseldorf, Germany.

T. C. Norris, named Cleveland district manager, sales, American Steel & Wire Div., U. S. Steel Corp.

F. D. Kennedy, appointed asst. manager, sales, New York district, Bethlehem Steel Co.

W. N. Murray, named branch manager, Boston office, American Air Filter Co., Louisville, Ky.

C. M. Schwitter, promoted head, market research activities, The International Nickel Co., Inc.

L. H. Seeman, named manager, Products Sales Engineering Dept., Greer Hydraulics, Inc.

D. K. Ballman, promoted to director, sales, The Dow Chemical Co; **W. R. Dixon,** promoted to general sales manager.

C. H. Eisenhardt, Jr., named Eastern area manager, sales, American Steel & Wire Div., U. S. Steel Corp.

D. W. Reagan, named Los Angeles district manager, B. F. Goodrich Industrial Products Co., Akron, O.

Dr. L. R. Fink, appointed general manager, X-Ray Dept., General Electric Co.

John Montean, appointed manager, Cri-Dan Div., The Lees-Bradner Co.

Following appointments are within the Truscon Steel Div. of

NIAGARA SECTIONAL *Aero* HEAT EXCHANGER

gives close temperature control, saves you

LABOR, Power, Water

● You gain in accurate control of quench bath temperatures and quickly effective capacity to handle initial peak load of heat in quenching. You prevent production set-backs, increase the output of your heat treating department, prevent oil fires, save losses from rejected parts.

Niagara *Aero* Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Use Niagara Aero Heat Exchangers also to cool and control temperature of furnace jackets, induction heaters, welders, wire drawing and extrusion dies, rolls, transformers, engines and all plant water cooling systems.

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District Engineers in Principal Cities of U. S. and Canada

Republic Steel Corp., Youngstown, O. **A. E. Lind,** named manager, merchandising; **Clyde Wilson,** appointed manager, Erection Div.; **L. R. Michels,** appointed asst. manager, sales, architectural products; **A. L. Munsell,** appointed asst. general manager, sales.

W. H. Dailey, Jr., appointed sales manager, Palletizing Div., Surface Combustion Corp.

W. S. Perkins, appointed director, purchases, general products group, Westinghouse Electric Corp.

E. W. Percy, named asst. sales manager, Williams Bucket Div., McDowell Co., Inc., Cleveland.

W. C. Bedoit, Jr., appointed manager, market development, Commercial Development Div., Jefferson Chemical Co., Houston, Tex.

L. A. Shea, appointed Eastern Div. manager, Lindberg Industrial Corp., Chicago.

H. E. Nims, promoted to controller, Niles plant, American Welding & Mfg. Co.

M. A. Haislup, appointed industrial sales manager, Borg-Warner International Corp.; **E. T. McKenzie,** appointed appliance sales manager; **J. D. Gulick,** appointed automotive sales manager.

Howard Gladding, appointed service manager, Rochester Products Div. of General Motors; **K. F. Lingg,** named asst. sales manager, Rochester Products Div.

D. F. Taylor, named general manufacturing manager, Buick, General Motors Corp.

J. A. Eckel, appointed asst. to the general manager, steel operations, U. S. Steel Corp.'s Pittsburgh office.

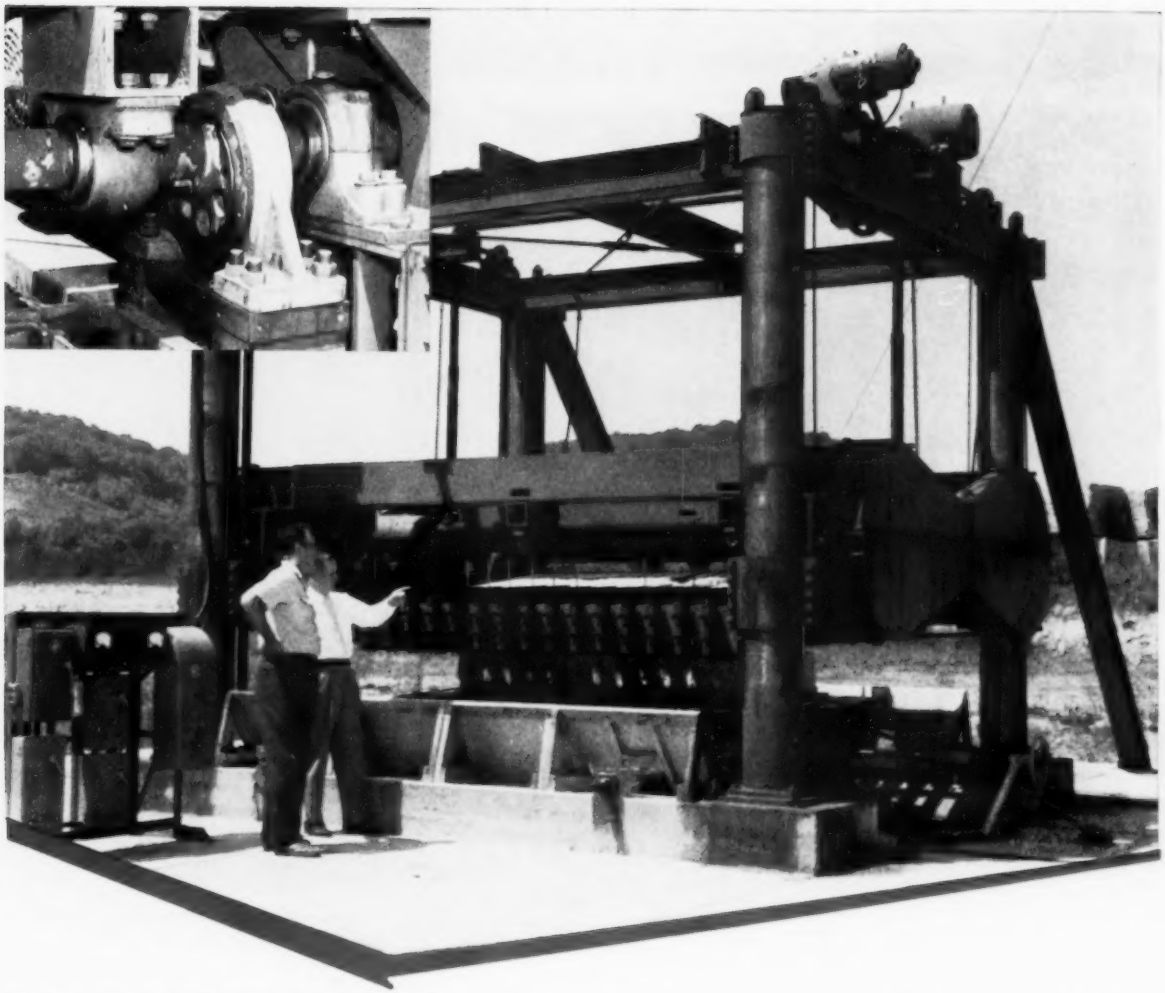
W. R. Harkness, promoted to sales manager, Seaboard Pacific Div., Associated Spring Corp., Gardena, Calif.

M. W. Webster, named controller, Universal-Cyclops Steel Corp.

T. C. Fricken, appointed sales manager, Southeastern United States, Meter & Service Station Pump Divisions, A. O. Smith Corp.

F. C. Valentin, appointed manufacturing engineer, Worcester Pressed Steel Co.

G. L. Owens, appointed manager, primary production, Great Lakes Steel Corp., unit of National Steel Corp; **J. G. Smith,** asst. man-



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Now, an eccentric bearing (shown above) specially designed by our engineers accurately controls movement of the blades into the work and with the use of carboloy tools on the blades, *stone is now actually cut for the first time.* No abrasives are required and cutting speeds are many times faster than with the old method.

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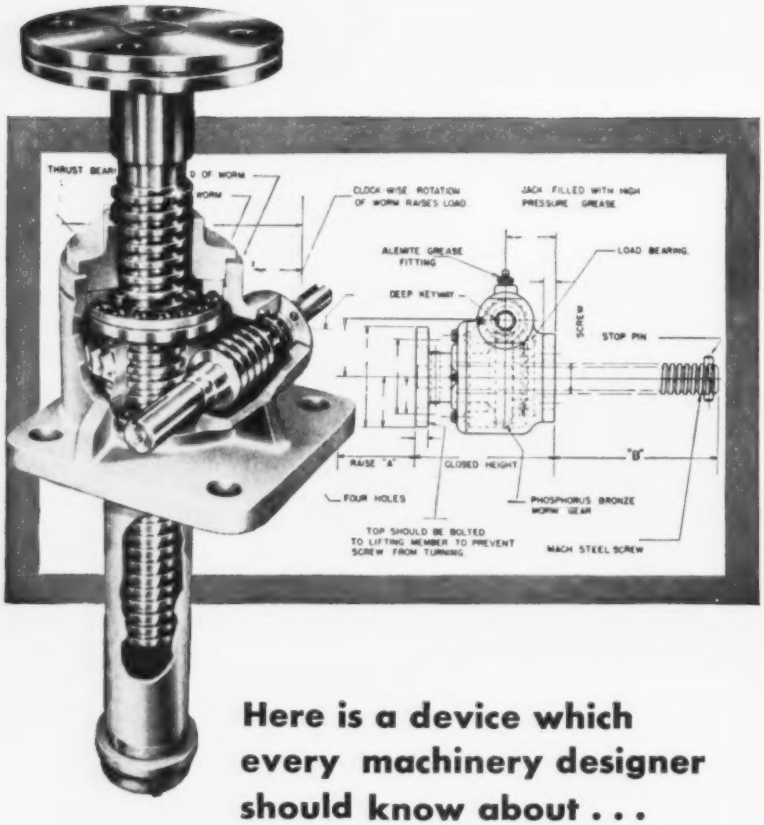

Here is a device which every machinery designer should know about . . .

DUFF-NORTON WORM GEAR JACKS

Duff-Norton worm gear jacks provide a purely mechanical means for accurate positioning of loads weighing as much as several hundred tons and maintaining them indefinitely without creep. They will operate in any position, and functioning as components of machinery and equipment they can raise and lower loads, apply pressure or resist impact. Jack capacities range from five to 50 tons. When two or more jacks are connected by means of shafting and mitre gear boxes they lift in unison, even when the load is unevenly distributed. They are available with standard raises up to 25 inches, and will provide exactly the same raise for years without adjustment. Worm gear jacks are suitable for operation at ambient temperatures up to 200°F.

Thousands of these jacks are in use on feeding tables, tube mills, welding positioners, pipe cut-off and threading machines, testing equipment, aircraft jigs, loading platforms, rolling mills, conveyor lines, arbor presses, and numerous other types of equipment. If you have a positioning problem, write for complete information, requesting bulletin AD-34-CC, which includes drawings and full specifications.

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Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks, Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

ager, primary production; **C. S. Christie,** superintendent, No. 2 openhearth unit; **Ralph Duffet,** asst. superintendent, No. 2 openhearth unit; **Norbert Hipp,** second asst. superintendent, Blast Furnace Div.

D. E. Weaver, appointed superintendent, S. Chicago plant, Republic Steel Corp.

T. M. Everhard, appointed sales manager, Detroit district, Steel & Tubes Div., Republic Steel Corp.

C. W. Iams, appointed asst. vice president, industrial engineering, U. S. Steel Corp., Pittsburgh.

R. H. Chittim, named asst. staff manager-tube, Chase Brass & Copper Co., Waterbury, Conn., headquarters.

M. J. Caserio, appointed manager, Milwaukee operations, AC Spark Plug Div. of General Motors,

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Cost-Cutting Ways
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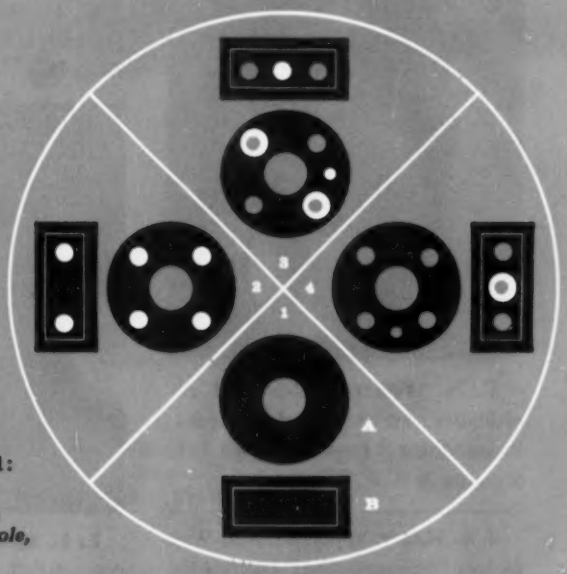
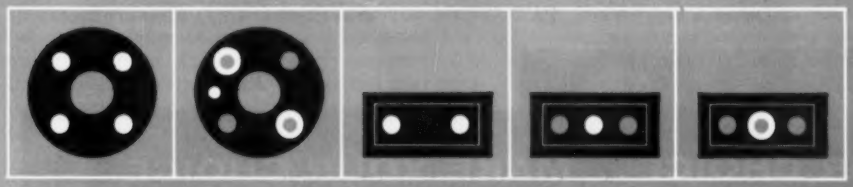
Any time your parts require machining *more than one hole*—drill, bore, face or tap—it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

Multiple Drilling Operations on Two Part-faces



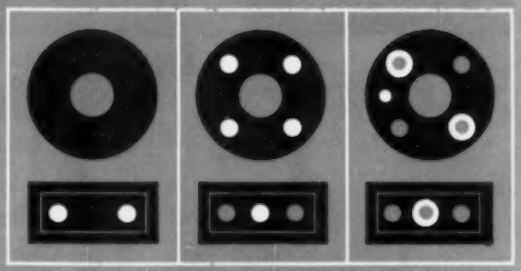
130 parts per hour—4-position rotary table. POSITION #1: *Unload finished part, transfer half-finished part, load new part.* POSITION #2: *Drill 4 holes, Face A. Drill and countersink 2 holes, Face B.* POSITION #3: *Drill 1 hole, ream 2 holes, Face A. Drill 1 hole, Face B.* POSITION #4: *Trepan 1 hole, Face B.*

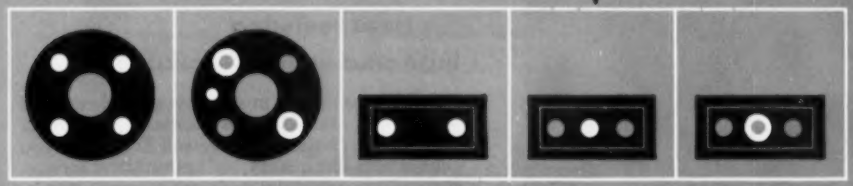


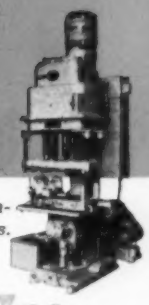
65 parts per hour—stationary fixture *with 5 work locations. Operator transfers parts after each stroke. One part completed per stroke.*

40 parts per hour—straight-line indexing. *After every 3 strokes, operator unloads finished part, transfers half-finished part and loads fresh part.*

23 parts per hour—tumble-type fixture. *Operator transfers and tumbles fixture from one position to the next. One part completed every five strokes.*







Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 50 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms of bored slip plates.

NATCO

National Automatic Tool Company, Inc.

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

Flint, Mich.; **G. R. Fitzgerald,** named director, engineering and equipment sales, Flint plants; **L. W. Tobin, Jr.,** appointed chief automotive engineer.

C. N. Wetherell, appointed coordinator, mechanized systems, Procurement Dept., Joseph T. Ryerson & Son, Inc., Chicago.

J. E. Haney, appointed Mid-West factory representative, Diehl Mfg. Co., Somerville, N. J.

J. E. Taylor, appointed abrasive engineer, Toledo, O. area, Norton Co., Worcester, Mass.

H. G. Mogensen, Jr., appointed district sales engineer, Detroit area, Grinding Machine Div., Norton Co., Worcester, Mass.

C. C. Wallace, appointed sales representative, Leschen Wire Rope Div., H. K. Porter Co., Inc.

L. L. Lenth, named plant manager, A. B. Farquhar Div., The Oliver Corp., York, Pa.

F. L. Wilson, named general superintendent, Farquhar Div., The Oliver Corp., York, Pa.

D. J. Bond will become sales representative, Special Products Div., Colonial Broach & Machine Co., Detroit.

T. P. Floridis, named applied research engineer, Applied Research & Development Laboratory, General Electric Co.'s Foundry Dept.

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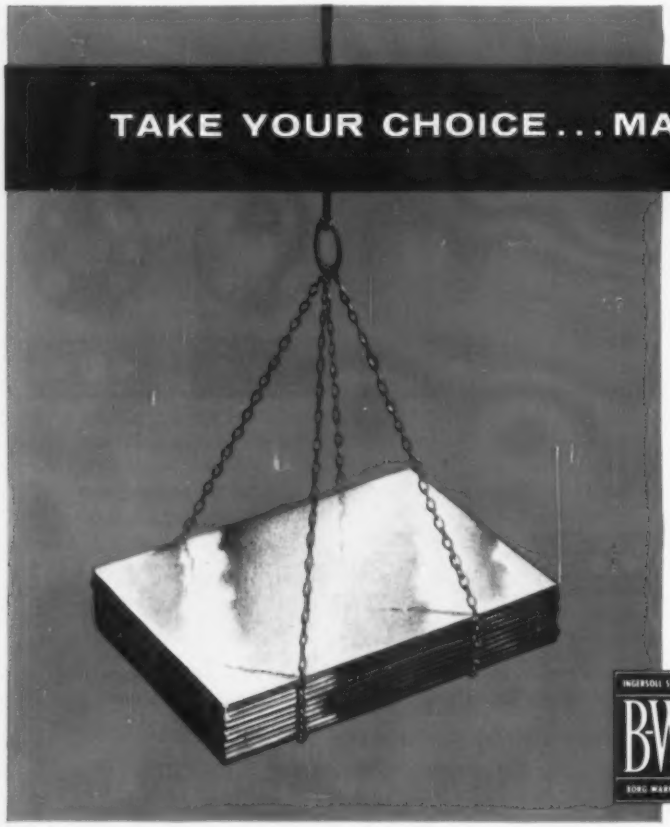

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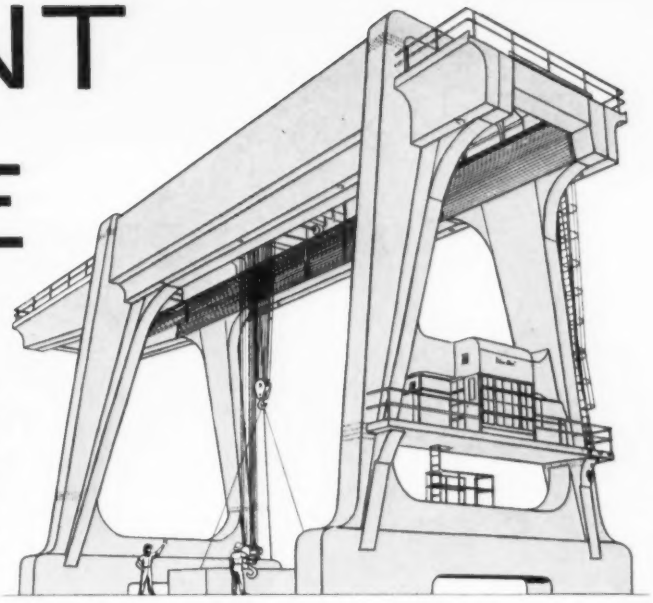

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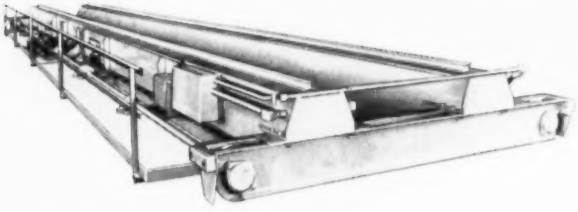

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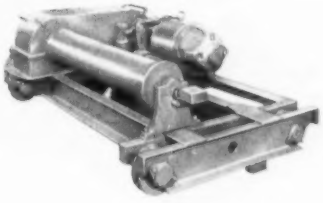

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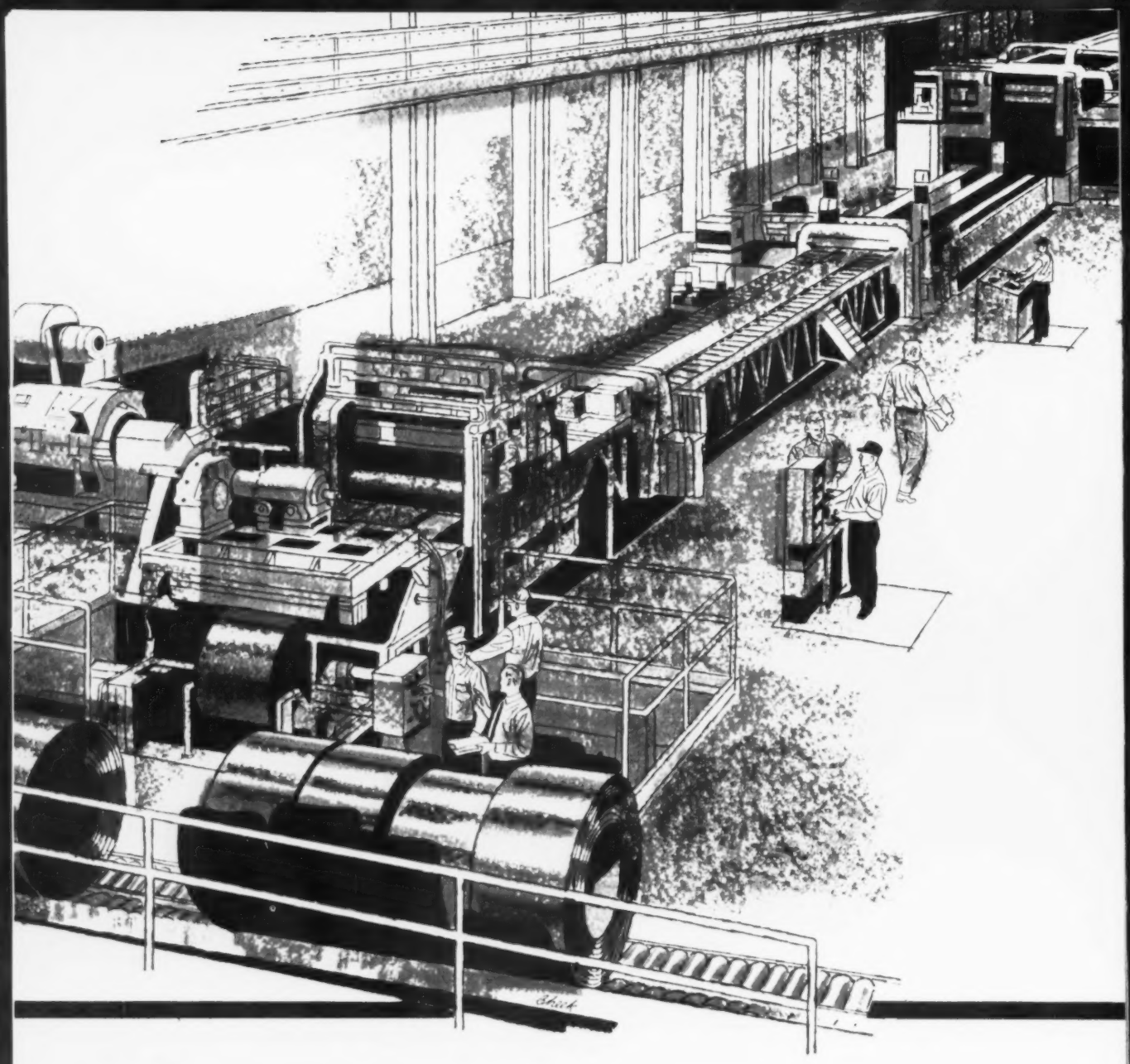

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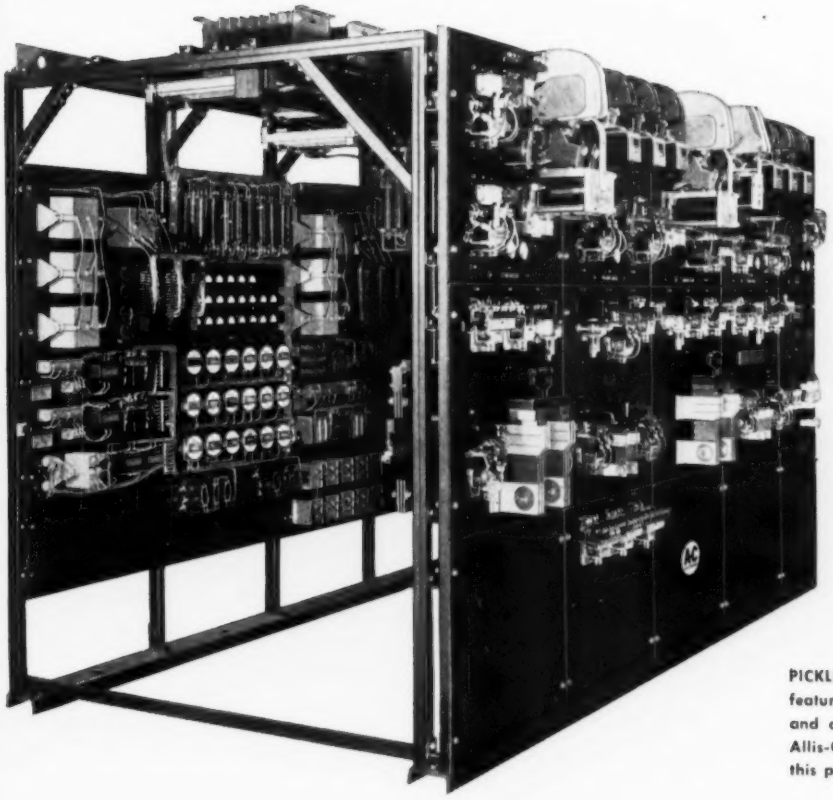

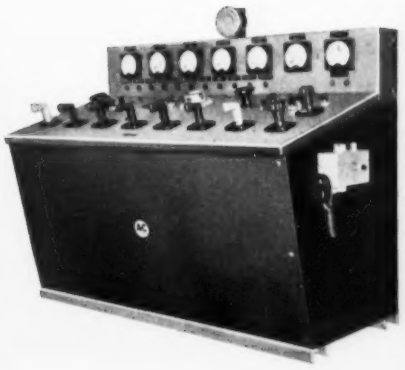

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ADDS HEAT: Carbonaceous cakes that make up Vallak hot tops contribute heat by burning as the metal cools.

New Hot Top Cuts Ingot Discard In Half

By **William Czygan**—Materials Editor

FAST INSTALLATION: Lightweight cakes are supported by hanger device and wedged in place. It takes only a couple of minutes.

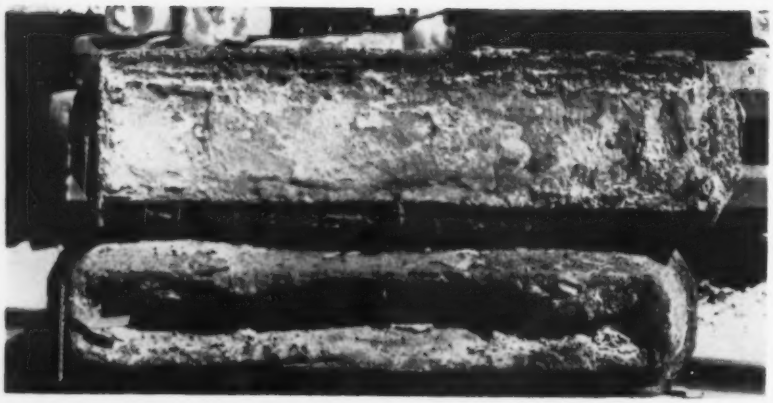
Still hardly more than a myth in this country, the Vallak hot top is gaining quite a reputation abroad.

Conservative Swedes, skeptical Germans and yen-wise Japanese are adopting it in fast-growing numbers.

Here's the whole story on how it works and what it'll do.

■ Scandinavia's latest contribution to steelmaking is a new way to raise killed steel ingot yield—one that cuts top discard to about 6 pct, does it simply and economically, and produces cleaner steel in the bargain.

It's a new hot top developed by



BIG SAVING: End view of two identical slabs, each weighing 6 tons. Bottom slab poured with brick-lined hot top produced 15.3 pct discard, while upper slab made with Vallak hot top had only 6.8 pct cropped. Saving amounts to half a ton per slab.

Enn Vallak, President of Ferrox AB, Grythyttan, Sweden. And if the enthusiasm of present users is any indication of its possible future, the patented Vallak hot top will probably go far. Most of the major Swedish mills and several large German producers are already using it. To a more limited extent its fame is spreading to the Orient, where Japanese steelmakers have begun switching over to the new idea.

Mills which have already adopted the Vallak hot top report yields up to 8.5 pct greater than with regular hot tops—savings running to half a ton of steel on a six-ton slab.

Other Benefits—This is its biggest advantage, but by no means the only one. First of all, the Vallak hot top is cheaper—according to some users about a third the cost of their former exothermic hot tops. Beyond this, it offers lower freight costs, simplified storage, lower breakage losses, and less likelihood of moisture pickup.

It leaves a larger opening, which cuts down on sloppy pours in smaller ingots. And its light weight makes application fast and easy; where cranes are often needed for placing brick-lined tops, the Vallak top is a simple hand job.

In fact, the new device is hardly even a hot top in the usual sense. It's nothing more than rectangular cakes of crushed coke, or a mixture of crushed coke and sawdust, with sulphite cooking liquor as a binder.

After forming and drying, the cakes are coated on the inside face and lower edge with a refractory material—fine sand, or a mixture of iron oxide and powdered aluminum. This generates heat when it comes in contact with the molten steel.

Work Three Ways—The dried cakes consist of countless tiny pores which, being mostly open, accomplish three things: first, they reduce heat transfer; second, they admit air for burning carbonaceous material in the cakes; and third, they provide a means for gases evolved by combustion to escape without passing into the molten metal.

The actual hot top is formed when the Vallak cakes are assembled in the top of the ingot mold. The usual mounting time runs from 30 seconds to 3 minutes.

No shoulder is needed. The cakes are simply wedged against the sides of the mold. This eliminates transverse stripping cracks in the upper part of the ingot; the Vallak hot top is free to move down in

Advantages of the Vallak Hot Top

Boosts ingot yield—one user reports an 8.5 pct increase, yields running to 94 pct pipe-free ingot.

Raises mill output—smaller top discards cut down remelting. Requires less metal in the feeder head and so produces more ingots per melt.

Makes cleaner steel—eliminates possibility of refractory inclusions that sometimes result from brick-lined or rammed hot tops.

Eliminates preheating—cakes are mounted cold, but actually supply heat by burning away when molten metal ignites them.

Cuts down sloppy pours—cakes leave a larger opening than lined heads, make small ingots easier to pour.

Simplifies mounting—lightweight cakes are easily and quickly applied by hand, eliminate need for crane.

Reduces mold requirements—cakes can be mounted anywhere in mold so ingots of varying size and weight can be poured in the same mold. Needs no mold shoulders or superimposed metal head casings.

Eliminates maintenance—hot top is disposable, disintegrates after use, so there's nothing to repair or reline.

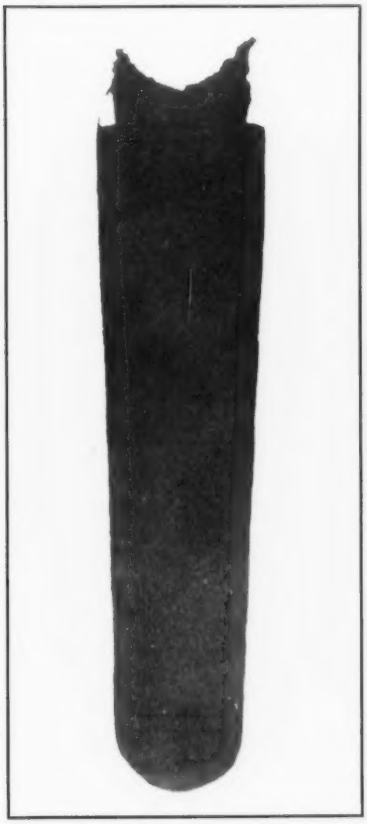
Simplifies storage—stacks of cakes take less space, will stand rougher handling with less breakage, and are less susceptible to moisture pickup.

Lowers first cost—one user says Vallak hot tops for a 12-in. ingot are costing him $1.50; exothermic tops formerly used ran $4.58. Also, freight savings result from light weight.

the mold as the ingot contracts during cooling. The cakes can be set at any height in the mold, so a single mold can be used to pour ingots of any desired length.

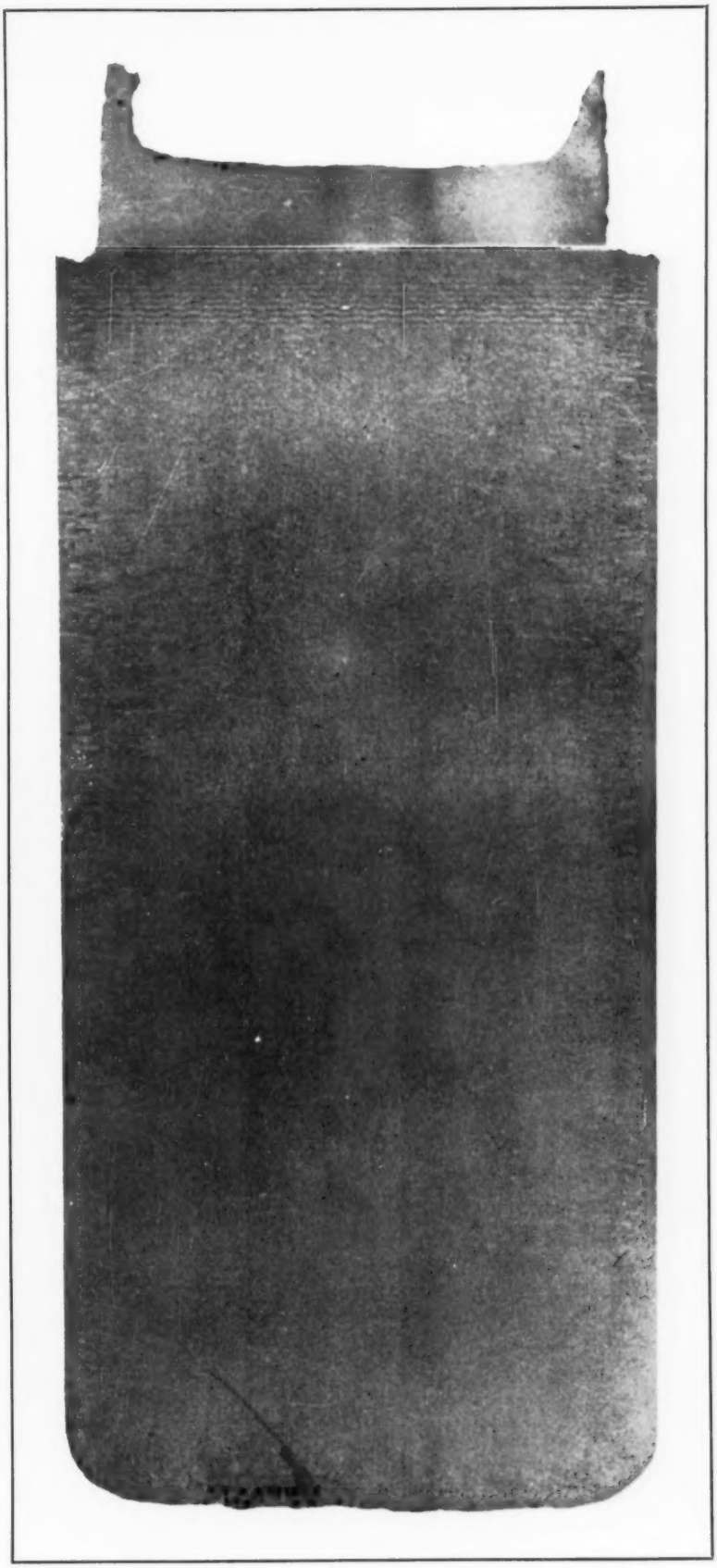
Requires Good Fit—The only critical point is the contact between the lower edges of the cakes and the mold walls. A good fit is needed to keep molten metal from flowing behind the cakes. The joint can be sealed with a special cement that turns to powder and so doesn't damage the ingot.

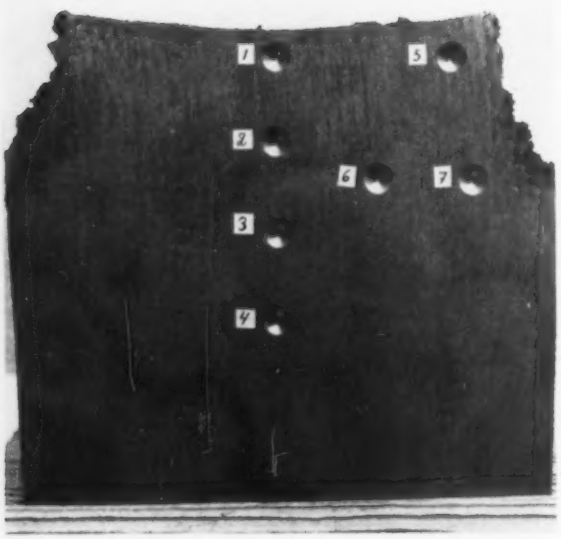
Where something like 60 pct of the computed heat losses in pours with conventional hot tops go to heat the top itself, the Vallak hot top actually contributes heat to the



LITTLE WASTE (above): Shallow sink and absence of pipe in this 13-in., 1900-lb ingot keeps top discard to 7.5 pct of total weight.

NO PIPE (right): Plate-bar ingot weighing about 3000 lb is completely free of secondary pipe and top discard is just 7 pct.





LOW PICKUP: Small increase in carbon and sulphur is limited o a thin outside layer of the head. Sample numbers in the table correspond to those in the photo.

Analysis of Section Through Top of 12-in. Spring-steel Ingot

	Carbon, Pct	Sulphur, Pct
Original Charge	0.54	0.011
Samples:		
1	1.44	0.018
2	0.93	0.014
3	0.58	0.008
4	0.57	0.008
5	0.64	0.012
6	0.58	0.010
7	0.68	0.012

Note: Scoop of anti-piping powder was added after pouring.

operation. Here's how it works:

When molten steel comes in contact with the sand or other refractory coating on the cakes, the coating material immediately sinters; this forms a glaze which keeps carbon and sulphur in the cakes from going into solution in the steel.

Burning Adds Heat—Then, when the coke or sawdust in the cakes is heated to the ignition point, it bursts into flame. Besides insulating the heavy upper part of the mold that would otherwise draw considerable heat away from the ingot, it supplies additional heat to retard solidification of the metal.

The rate of combustion can be controlled by varying the proportions of materials in the cakes. Gases go out through the pores, and through the ever-widening clearance between cake and mold wall as burning proceeds.

Even after the cake has burned, the porous skeleton of ash that's left continues to be a good insulator. The only significant heat loss is by radiation from the surface of the molten metal, and this is largely countered by covering materials such as liquidators.

Feeds Longer—Thus, the Vallak hot top keeps steel in the feeder head molten long enough to prevent shrinkage cavities and produce uniform flat sinking in the top of the ingot. And since premature solidification is eliminated, much less metal is needed to feed and counteract piping. Only a small collar of frozen steel forms around the lower edge of the feeder head.

Effectiveness of the new method is borne out by reports from Swedish mills which are now using it on a variety of steels.

One mill reports an increased yield of 7 pct on 16-in. silicon-manganese ingots.

Another, pouring 5900-kg slabs (about 6 tons), had a top discard averaging 15.3 pct of ingot weight with standard brick-lined hot tops; top discard on the same slabs poured with Vallak hot tops is only 6.8 pct of ingot weight, for a reduction of 8.5 pct in top crop or a saving of half a ton of steel per slab.

Still another, pouring 4500-lb spring steel ingots, is getting a 7.2 pct. increase.

Clean and Uniform — Cleaner steel also results, because the new method does away with refractory inclusions. This makes for further savings on down the line in the form of better yields in the rolling mill.

That the surface coating on the inner face of Vallak hot tops does its job well is shown by chemical analyses of sectioned ingots. Carbon and sulphur pickup are limited to a very thin layer adjacent to the interface between the steel and the Vallak cakes.

To date, little has been heard of the Vallak hot top in this country. But Republic Steel and several other American firms have been running tests for more than a year to see how it fits into our methods and economics. So far, they say it looks mighty good.

American Ferrox Corp., New York, is now producing Vallak cakes in this country.

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New Theory Bolsters Grinding Research

By P. M. Unterweiser—Metallurgical Editor

Grinding is becoming more of a science, less of an art.

Take the case of measuring grinding temperatures. Once hopelessly confused, latest measurements are helping to untangle many a shop problem.

Here's a theoretical approach that's bound to lead to practical profits.

▪ Much of our present knowledge of grinding is the product of a trial-and-error approach. It isn't, strictly speaking, the outcome of scientific method. Rather it reflects a collection of practical answers derived by first stumbling through a series of mistakes.

There are at least two things the grinding researcher doesn't like about the trial-and-error approach. It is often laborious and wasteful. And it seldom lends itself to systematization and quantitative measurement.

Need For Measurement—To improve grinding techniques and equipment, the researcher argues that it is first necessary to understand what grinding involves. Every aspect of the grinding operation must be reduced to accurate measurement.

Take the all-too-common problem of grinding burns, for example. We know that a high grinding temperature can severely damage the surface of hardened steel. It can result in tempering, spot annealing, or even thermal cracking.

We also know that "hot" grinding can adversely affect the size accuracy of the workpiece. Uneven temperature distribution at the surface can cause serious distortion.

Checking Temperatures—There are a number of practical answers to the problem of grinding burns. But the scientist wants to get at the root of the problem. To do so, he first tries to analyze the mechanism of the heat generated. And as part of his analysis, he tries to accurately measure the resulting temperatures.

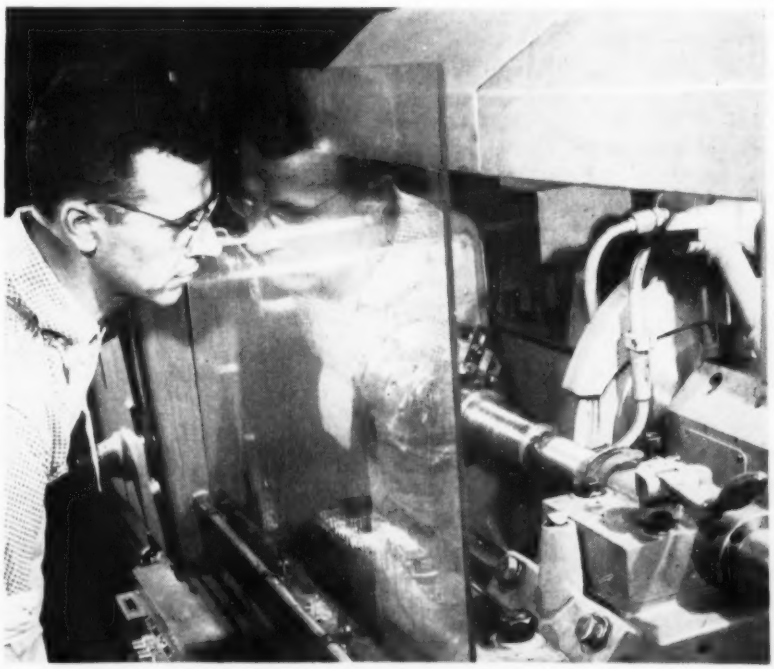
Despite its obvious merit, the scientific approach to grinding research is mighty rough sledding. Its route is lined with an almost endless series of obstacles. Prior to 1915, no one so much as attempted an approach to the problem on a strictly scientific basis.

New Approach—But in 1915, J. J. Guest came up with an equation for measuring the temperature rise of grinding chips. Some of Guest's assumptions have since been disproved. But a few of his conclusions were quite sound.

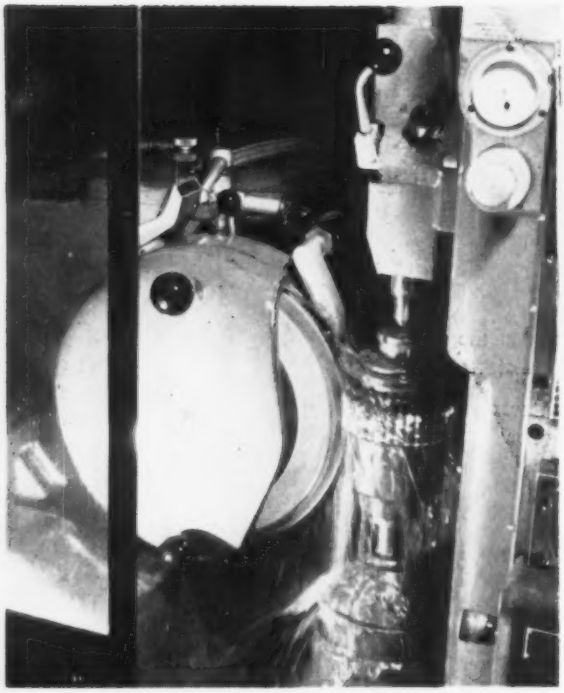
For example, he determined that the larger the horse-power per unit chip volume, the higher the temperature rise of the grinding chips. He also showed that the harder the grade and the finer the grain size of the grinding wheel, the higher the temperature rise.

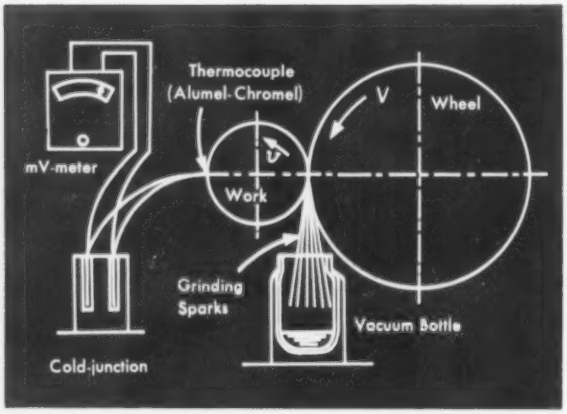
Most important, Guest proved for the first time that a scientific approach to grinding was both possible and feasible.

Progress and Problem — Since



FOR BETTER GRINDING: A combination of mathematical formulas and direct heat measurements is shedding new light on old problems.





CAREFUL CHECK: Average temperature rise of grinding chips is measured by means of a water calorimeter shown schematically above. Chips are collected in vacuum bottle placed just below grinding point. Temperature rise of known quantity of water is measured by thermometer graduated in 0.1°C.

NEED FOR KNOWLEDGE (left): Better understanding will spawn new methods, lower cost.

1915, the scope of grinding research has grown by leaps and bounds. A variety of systems of measurement have been developed. Still, one important problem was left pretty much to contention. That problem: how to measure grinding point temperature.

To date, the problem has been approached in two ways. One is to measure the grinding point temperature at the contact surface of the work and the grinding wheel or—more accurately—of the work and the grit. The other is to obtain an "average" temperature of the work surface.

Big Spread—The answers produced by these different methods are invariably miles apart. For example, it is common for the first method to produce a surface temperature reading of about 1850°F or higher. The second method, applied to identical conditions, will indicate a surface temperature of 100-150°F.

This king-size discrepancy was one of the grinding researcher's major dilemmas.

There's a good chance that it won't be a dilemma anymore. For, at last, these two points of view have been "synthesized."

The man responsible for this major development is Prof. Kenjii Sato of the Engineering Dept. of Tohoku University, Sendai, Japan.

Key Theory—Dr. Sato combines an analytical (mathematical) approach with the added backup of direct temperature measurements. Essentially, he estimates the heat generated in grinding by (1) the tangential grinding force and (2) the ratios of heat distribution to the work, the chips, and the grinding wheel.

From the amount of heat fed to the workpiece, he theoretically determines the temperature at the work-wheel contact surface. To accomplish this, he makes use of a theory that predicts the temperature rise of the surface of a semi-infinite body under an instantaneous heat source.

Verifies Measurements—Finally, he quantitatively explains the effects of grinding variables on grinding temperature. For this, an analytical formula of the grinding temperature is used. All analytical theory is verified by direct grinding temperature measurements.

The theoretical aspects of Dr. Sato's work are based on a considerable number of complex equations and formulas — any one of which will quickly discourage the non-mathematician.

Prior to development of the electronic computer, this mathematical complexity might have severely limited the general usefulness of Sato's work. Fortunately, this is no longer the case.

In The Chips — Some of the methods and equipment used to obtain direct temperature measurements are of special interest. The water-calorimeter setup (above) for measuring chip temperature is a typical example.

Here the grinding chips are collected in a vacuum bottle containing a measured (40cc) amount of water. The bottle is placed just under the grinding point. The temperature rise of the water caused by the hot chips is measured by a precision mercury thermometer.

Finer Points—Two possible modifications in the temperature rise of

the vacuum bottle are carefully compensated for. One is the temperature differential between the inside and outside of the bottle during chip collection. The other is the cooling effect caused by evaporation of water in the bottle.

Here are actual procedures used in an average test, as described by Dr. Sato:

"First, the temperature of the water in the bottle is measured. After removing the cover, the workpiece is turned and the bottle is set just beneath the grinding point. The grinding wheel begins to turn 40 seconds after the cover is removed. From 60 seconds on, five grinding passes are performed in 30-second intervals.

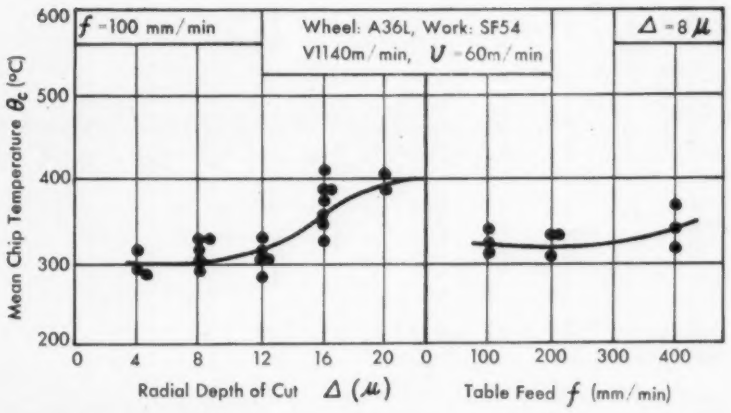
Use Thermocouple — "At 3½ minutes the wheel is stopped. Fifteen seconds thereafter, the cover of the bottle is put on, and the temperature rise is measured. The workpiece is stopped at 4½ minutes, and the surface temperatures of the workpiece are measured by touching an alumel-chromel thermocouple every 10 seconds up to this time. The chips are taken out on a glass dish and are weighed after drying. . ."

Summing Up—These are a few of the major conclusions derived from recent tests on a medium-carbon steel:

(1) Of the total heat generated during the grinding, about 84 pct enters the workpiece. Roughly 4 pct is carried off in the chips. Most of the remaining 12 pct is dissipated in the wheel. This relationship remains fairly constant, even in plunge-cut grinding.

(2) Total heat per chip weight is about 1000 cal/gm in cylindrical grinding. It climbs to about 2000 cal/gm in plunge-cut grinding. Both values are far higher than those obtained in bit cutting (70-100 cal/gm) or milling (120 cal/gm).

(3) The ratio of remaining heat to the total heat entering the workpiece increases with wheel depth of cut and with decreasing table feed. For this reason, it is desirable in finish grinding to use a shallow grind and a high table speed.



GRINDING CHIP TEMPERATURES: Plotted above are grinding chip temperatures obtained in tests on the Japanese equivalent of SAE 1035 steel. The exact grinding conditions are shown on the chart. These tests determined that the mean chip temperature in cylindrical grinding is about 300°C, varies slightly with depth of cut and table feed.

Acknowledgment is made to Prof. Kenji Sato and Tohoku University, Sendai, Japan, for the use of grinding test data and line drawings presented in this article.

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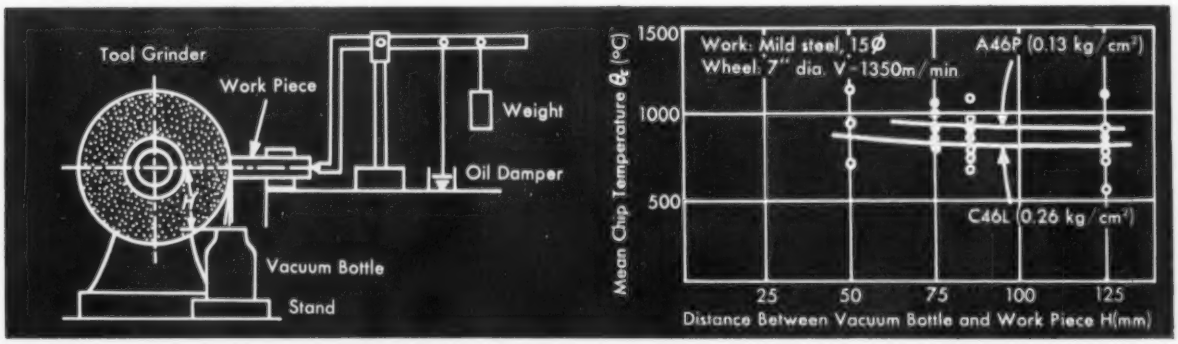


PLUNGE-CUT GRINDING: The test rig shown above helped solve a number of problems. By varying the height of the stand (thus changing the distance between the workpiece and the vacuum bottle), it was determined that mean chip temperature was not affected by slightly extending the flight of the chips in air. Mean chip temperature varied between 800°-900°C, was considerably higher than that obtained in cylindrical grinding. Results of these tests are plotted on the curves shown at right, above.

Plastisol Linings Enlarge Scope Of Plating Operations

By: R. C. Daley—Plant Mechanical Engineer, Sikorsky Aircraft, United Aircraft Corp., Stratford, Conn.

Interchangeability—It's a valuable asset to a plant with flexible production needs.

All the more so with plating tanks.

It takes a tank lining that will withstand many plating solutions.

▪ Plating procedures have to be versatile at any plant with changing production demands. Such is the case at Sikorsky Aircraft helicopter plant of United Aircraft Corp., Stratford, Conn. The product is constantly getting design improvements.

The company anticipated this in setting up plating lines. The tanks would not necessarily be used very long for any given plating solution.

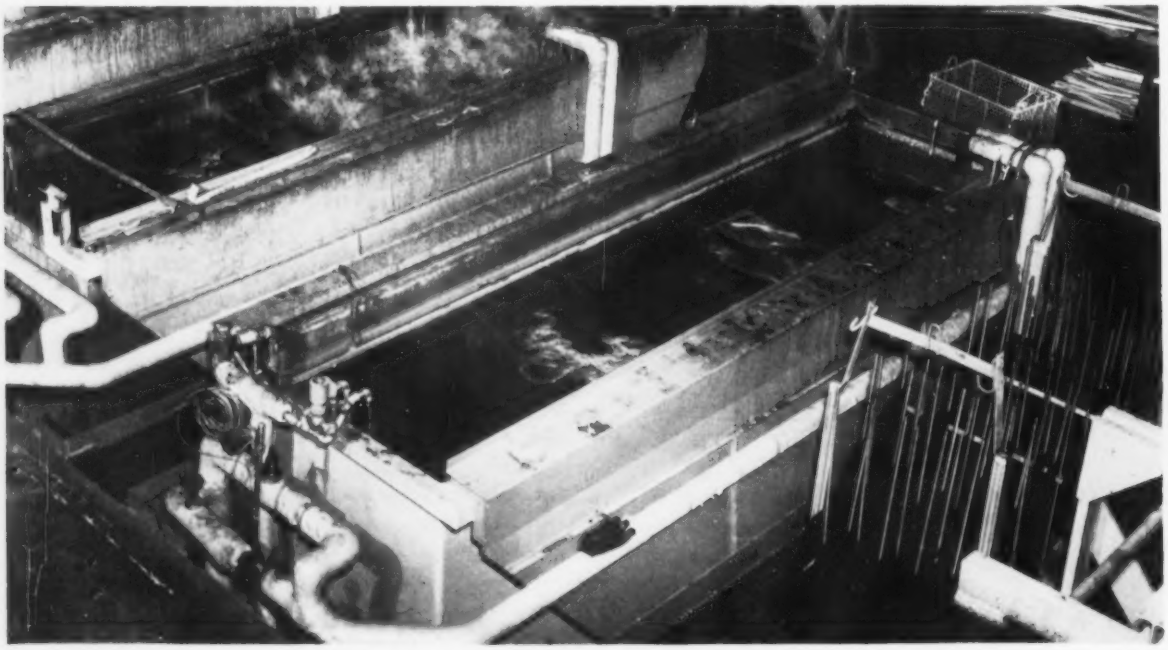
Basic Tank Coating—With this in mind, Sikorsky chose a plastisol coating to resist a wide range of solutions used in plating work. Over half the 74 tanks at the plant were coated with Unichrome 5300, a plastisol produced by Metal & Thermit Corp., Rahway, N. J.

The tanks switch from one use to another simply by draining the old solution, cleaning the tank, and filling it with the new solution. Cleaning the hard smooth surface of the plastisol coating requires only thorough rinsing and wiping out of any residue from the previous solution.

In two years of service the plastisol coated tanks have stood up to a wide range of processes: Dichromate surface treatment of magnesium; alodine treatment of aluminum; cadmium, copper and chrome plating; acid pickling; and quenching with nitrate solutions. Several tanks are used for stripping paint and plating. Two tanks are used for experimental work in testing plating solutions and techniques.

Unexpected Advantages — One tank is used exclusively for leak testing of helicopter oil reservoirs. The ease with which the tank is cleaned and its smooth, light color surface make it ideal for this purpose.

By dipping the pressurized oil reservoirs in the water filled tank, minute leaks show up as air bub-



QUICK CHANGE: All that's needed to change solutions is to wash, and rinse the hard plastisol lining.

bles. The tank has required no painting or other maintenance.

In another application, two sheet metal sinks are plastisol covered to serve as battery room sinks. Costing less than half as much as acid resistant sinks made of other materials, they have stood up against the continuous corrosive attack of battery acids.

How It's Applied—Several spray coats are put on to build thickness to 80 mils. For accurate control of coverage a different color compound is used for each coat.

Thickness is checked with a roller gage to measure depth of the coating while wet. After coatings are oven baked to harden, they are spark tested for possible leaks.

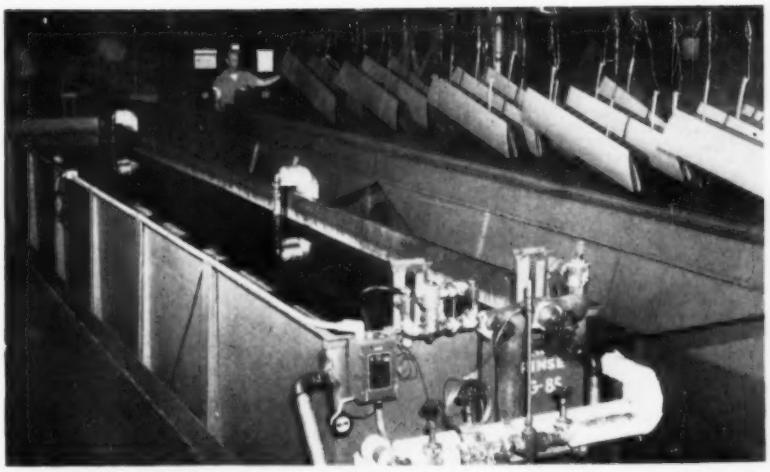
Spraying the final coat on the outside of tanks as well as the inside provides an inexpensive maintenance coating. Tanks need not be painted when the entire plant gets a semi-annual maintenance going over.

The only limitation to complete flexibility in using plastisol coated tanks for all plating room operation is encountered with high temperature solutions. Plastisols tend to blister when solution temperatures go above 160°F.

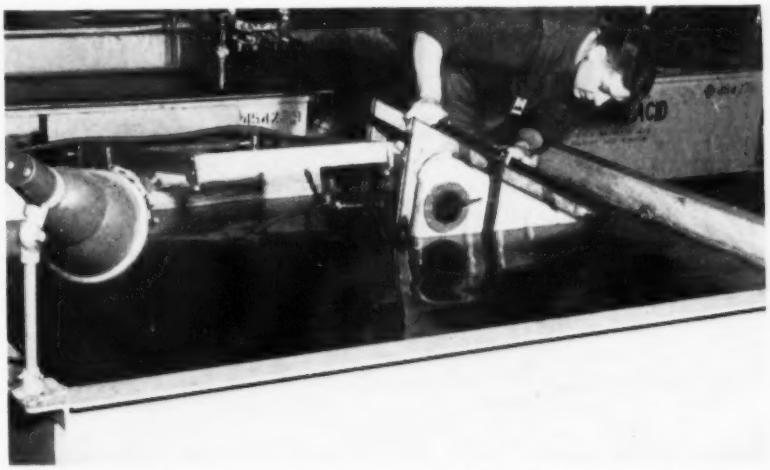
Blistering doesn't stop operations immediately, but eventually the blister will crack and admit the solution to the metal surface. This happened to one tank with a defective temperature regulator.

Repairs Easy — Damaged coatings are easy to repair. The blistered area is scraped clean and new plastisol is sprayed over the bare metal. A portable radiant heater is used to bake the compound on the spot.

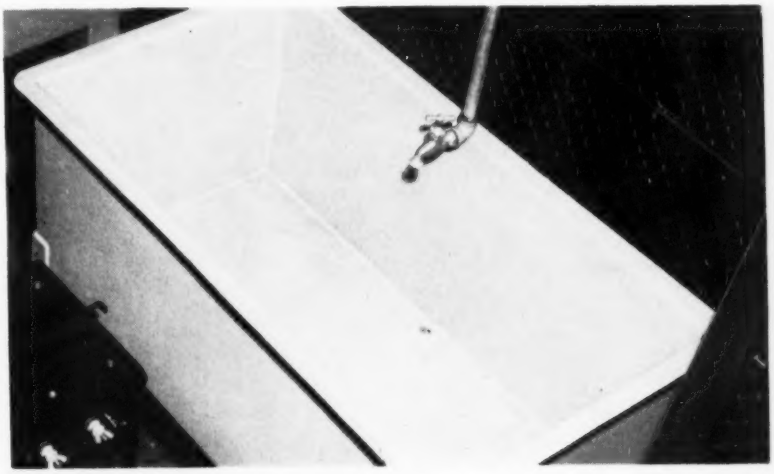
The maintenance department at Sikorsky considered in-plant application of plastisol coatings to tanks, plating racks and other equipment exposed to corrosive solutions and atmospheres. However, original coatings applied to tanks in 1955 have stood up so well that experiments with in-plant application haven't been necessary.



ECONOMIC PROTECTION: Large size tanks are currently used for dichromatic treatment of helicopter components.



EXTRA USES: The clean, clear surface of the plastisol coating shows up leak bubbles readily.



RESISTS ACIDS: Plastisol-coated sink has suffered no deterioration after almost two years of constant use.

ON CAMERA: First step is to photograph original art and prepare a master printing plate.

Etch Stainless Plaques Quickly And Profitably

Etching attractive, durable designs on panels of stainless steel is a profitable business for many firms.

The technique is simple, the equipment relatively inexpensive, the results impressive.

▪ Large sheets of stainless steel can be etched quickly and easily to serve many decorative purposes.

For example, Metal Etching Corp., Queens, N. Y., finds that these sheets make attractive award plaques. They last virtually forever, retain their original beauty, and cost less in terms of material and labor than many plaques of more conventional design. Moreover, excellent work can be done with relatively little equipment and experience.

Although the firm etches sheets from the 200, 300 and 400 stainless series, the 300 series is slightly preferred for corrosion resistance and color stability.

Choice Of Etchants — Any of several different etching solutions may be used:

(1) Ten parts of 60 pct nitric acid, plus four parts of 45 pct hydrofluoric acid, plus 86 parts of water, used at 130-140°F.

(2) Twelve parts of 60 pct nitric acid, plus five or six parts of 45 pct hydrofluoric acid, plus 82 or 83 parts of water, used at 130-140°F.

(3) Six hundred and twenty five grams of ferric chloride hydrate, plus 44 g of ammonium chloride diluted to one liter.

(4) Four parts of 20-30 pct ferric chloride solution, plus one part commercial hydrochloric acid, plus ¼ part commercial nitric acid.

(5) One hundred parts by weight hydrochloric acid, plus 6.5 parts by weight mercurous nitrate, plus 100 parts by weight of water.

Etching Rates Vary — Solutions (1) and (2) develop a light etch in 15 minutes to one hour. No. (3) produces a relatively deep etch in about one hour at room temperature. Nos. (4) and (5) produce deep etches in from 20 to 45 minutes at room temperature.

Trial will show which solution is best for a particular job. In each case where nitric acid is used it acts as an inhibitor; its concentration must be carefully maintained to avoid pitting the steel surface.

Metal Etching Corp. starts a

TO RESIST ACID: Design is printed on stainless plate and wet ink gets coat of asphalt powder.

production run of identical plaques by photoengraving the original art and copy onto a printing plate. This plate and blank to be etched are placed together in a printing press.

Ink Coats Blank — The blank plate is then offset printed, and as the background becomes coated with ink, the areas that represent artwork and copy remain un-inked.

While the ink is still wet the blank is dipped into finely ground asphaltum. This powder adheres to the tacky ink and leaves the exposed areas sharply outlined. The plate is then heated to fuse the asphaltum and ink into an effective acid "resist."

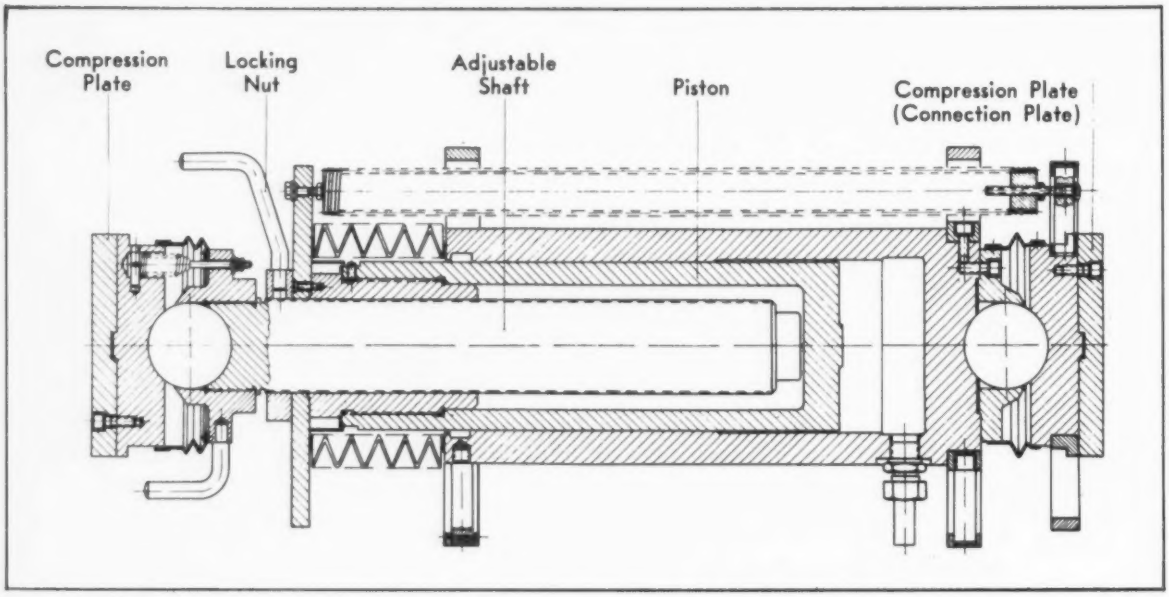
When only one plaque of a kind is made, the printing plate stage of the process is omitted. Instead, the stainless blank is completely covered with a resist which is then carefully cut or engraved away from the areas to be etched.

Etches Cleanly—The next step, both for production quantities or single plates, is to immerse the steel plate in the etching bath. The resist repels the acid so that only the exposed steel surfaces are attacked. Excellent definition is achieved without additional routing or hand finishing.

When the proper etch depth is obtained, the plate is rinsed clean. If color contrast is desired, enamel is sprayed into the etched depressions. Overspray is scraped from the background surface. Oven heating then hardens the remaining enamel, after which the steel surface is buffed to a satin finish, the plate is trimmed and mounting holes are drilled.

The result is a clear, bold area of image and text set attractively against a clean stainless steel background.

MIND THE FINGERS: After ink and asphalt are fused into an acid "resist," the bare metal areas of artwork and text are etched.



LOADING UNIT: Testing cylinder features locking nut and adjustable shaft for easy mounting.

Fatigue Machine Tests Designs And Materials

The proof of soundness of design is in testing under controlled conditions.

Where it's easy to test specimen materials, the testing of full-size structures can be more meaningful.

The equipment for such testing must be adaptable to both size of structure and variety of testing.

▪ When it comes to testing the design of large structures, it takes a testing machine large enough to simulate actual conditions. Such machines have been available largely as single-purpose or laboratory built units.

By using separate loading cylinders, a new fatigue testing machine extends its usefulness for testing any size section. It's a recent introduction of Riehle Testing Machines Div., American Machine and Metals, Inc., East Moline, Ill.

Developed in Germany by Losenhausen, the testing machine will initially be handled in the United States and Canada by Riehle. Within a year, Riehle expects to be manufacturing the machines at its East Moline plant. Under the same license agreement the German firm will build Riehle testing machines in Germany.

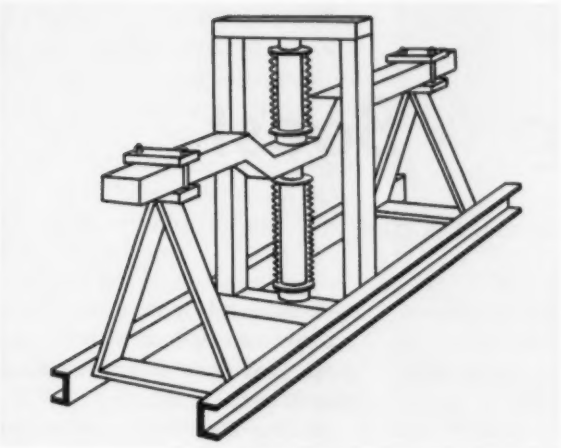
Versatile Testing — The fatigue machine simulates a wide variety of stresses and frequencies found throughout industry. Operating in conjunction with the separate loading cylinders are a basic control console, a pulsator and a programmer.

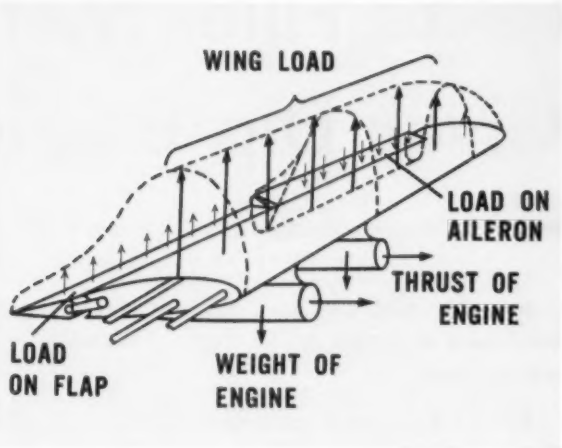
The auxiliary equipment necessary for testing various designs can be furnished by the user to meet test program requirements. In most cases the test stands, test hoists, or concrete plates with anchoring devices can be made by the user. Riehle can provide assistance in suggesting methods of testing.

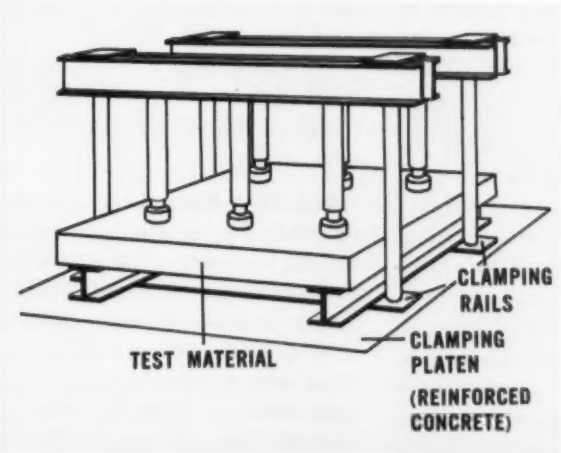
The control console measures and indicates the load developed in each cycle. There are two basic types of cycling: (1) the fluctuating load (high and low values) in either tension or compression; and (2) the alternating load (maximum in compression through zero to maximum in tension).

Wide Limits — The new testing machine applies dynamic loads up to 200,000 lb and static loads up to 400,000 lb. Higher capacity machines are available on special basis.

The stroke is variable from zero to the maximum capacity of the pulsator. A special control console providing frequencies from 0 to 100 cycles per minute is also offered for applying longer strokes at lower







ABOVE: Arrows show where loading would be applied on aircraft wing. Testing units combine to simulate stress.

TOP-LEFT: Typical test stand for alternating loads checks reinforced concrete beams, bedplates, and similar structural parts.

BOTTOM-LEFT: In this setup six testing cylinders distribute load over large surface area of ceiling material.

frequencies. The length of stroke is governed by the length of the particular loading cylinder.

The loading cylinder itself is hydraulically actuated, axial loading for both tension and compression. Hydraulic actuation was selected for its durability and minimum service needs. The dynamic capacities vary from 12,000 to 200,000 lb.

How To Set Up—Some structures have well defined load distribution. However, with three or more supports existing, a structure is not statically determinate.

In any case, the desired load distribution can be obtained by setting up the supports and the individual testing cylinders to simulate actual conditions.

In dynamic testing, the test is continued until either a predetermined minimum in load cycles is obtained, or until fatigue cracks appear in the structure.

TYPICAL SETUP: Operator controls test at console. Programmer is at right. Test stand holds single test unit and specimen.

Paste Filler Metal Gives Dip Brazing A Boost

By A. M. Setapen—Manager of Engineering, Handy & Harman, New York

Assembly time has been the bottleneck in dip brazing of aluminum joints.

To do a good job it takes time to place preforms and fixtures securely and accurately.

But use a new paste filler and you can do without preforms. As a matter of fact assemblies can be held together by simple spring fixtures.

▪ The increase in use of aluminum for both industrial and military products has brought on advances in techniques for joining this metal. So it is with brazing joints in aluminum assemblies.

A recently developed powdered aluminum filler metal cuts assembly time and substantially increases the uniformity of production joints. It's applied as an aqueous paste and brazed in a flux bath.

Called Handy Alumibraze and produced by Handy and Harman, New York, this aluminum filler metal has been used for production brazing for almost two years at The Glenn L. Martin Co., Baltimore. It has reduced assembly time by as much as 95 pct for certain complex parts.

Advantages Add Up—Besides reducing assembly time, the use of this alloy has additional advantages:

(1) Tensile strengths up to 45,000 psi have been obtained in joints of 1/16-in. gap in Type 6061 aluminum.

(2) The filler metal is only applied where needed and in quantity needed, resulting in very little waste. During the brazing, the filler metal does not spread outside the joint area, but wets and bonds only in those areas applied.

(3) The fillets are small, uniform, and in many respects superior to those produced by the conventional preforms or clad-brazed sheet. The joints need little if any clean-up after brazing.

(4) The filler metal can be applied to just about any shape of part or joint location that can be reached with an applicator.

(5) The process is conducted in a molten flux bath, which practically eliminates distortion caused by uneven heating.

How Filler Metal Works—Handy Alumibraze is an aluminum-silicon eutectic consisting of 88 pct aluminum and 12 pct silicon (AWS designation BA1Si-4). It melts between 1070-1080°F. The powder, combined with a controlled amount of flux-cement, is made up into an aqueous paste and coated directly onto the joint area.

When the slurry dries, the flux-cement acts as a binder to hold the filler metal in place. The binder does not melt at the usual brazing temperatures, but is soluble in the flux.

When the assembly is dipped in the flux bath, the binder dissolves to permit the molten filler metal to flow through the joint. The filler distributes itself by capillary action and forms a bond by wetting the parent metals. A fillet is produced by using a slight excess of filler metal.

Wide Application—To date Alumibraze has been used with more than a dozen wrought alloys including types EC, 1100, 3003, 5050, 5052, 5056, 5254, 6053, 6061, 6062, 6063, 6066, X2219 and X5356, as well as several cast alloys. Optimum joint clearances

SUPERIOR BOND: Completed assembly needs little if any mechanical finishing. Slight excess of filler makes small uniform fillets.

are about the same as those for silver brazing, i.e., 0.002 to 0.006 in. for maximum strength.

On precision assemblies, such as radar plumbing, a tolerance of ±0.002 in. is typical. On certain types of joints, notably the longer type lap joints, it may take tolerances of 0.010 in. and larger to fill the joint area.

Almost any conventional type of joint suitable for brazing can be used, though straight butt joints should be avoided. Also tight fits may interfere with the flow of the molten filler metal into the joint.

Must Be Clean—First step is to deburr and clean before attempting to braze. This means removal of all oil and grease. When working with the nonheat-treatable alloys, vapor or solvent cleaning will usually do the job, for example a trichlorethylene vapor followed by a 45-second dip in a detergent-type cleaner and a water rinse.

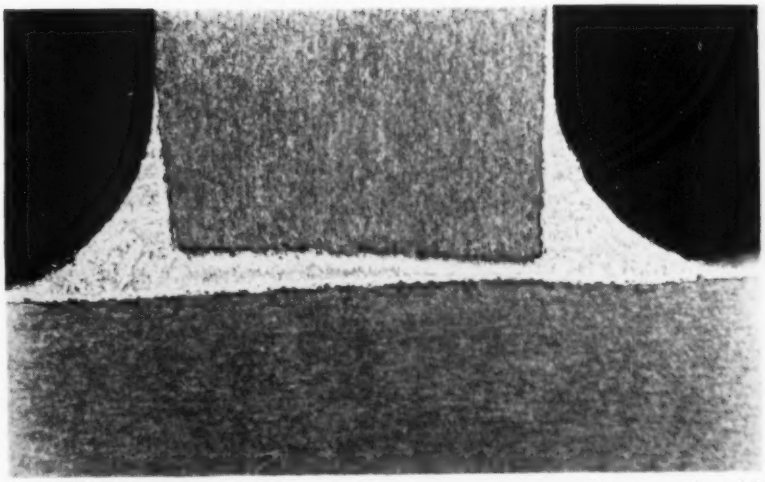
When working with the heat-treatable alloys, etch-type cleaning in acid or caustic is usually necessary to remove the more tenacious oxide. A typical chemical cleaning method consists of a 50 pct nitric acid bath followed by one of the several proprietary oxide-removing cleaners and then a hot water rinse.

A persistent oxide scale may require caustic treatment. This consists of immersing the parts in a 5 pct solution of sodium hydroxide at 150°F for 30-60 seconds followed by a cold water rinse. This is followed by a 10-20 second dip in cold 50 pct nitric acid and then a cold and/or hot water rinse. When tolerances are critical, allowances must be made for the metal dissolved.

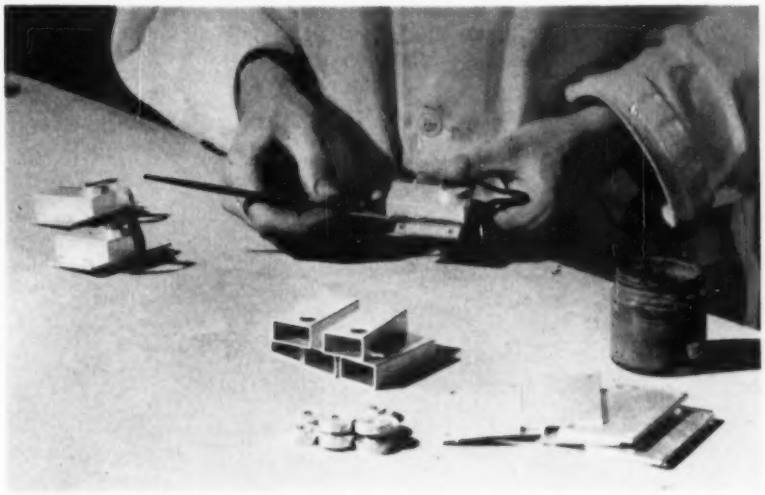
Oxides can also be removed mechanically with steel wool, an abrasive belt, or with a 6-in. powered brush with stainless-steel bristles 0.002 to 0.005 in. diam, rotating between 1800 and 3600 rpm.

Parts should be stored carefully to prevent recontamination and should be brazed within 48 hours.

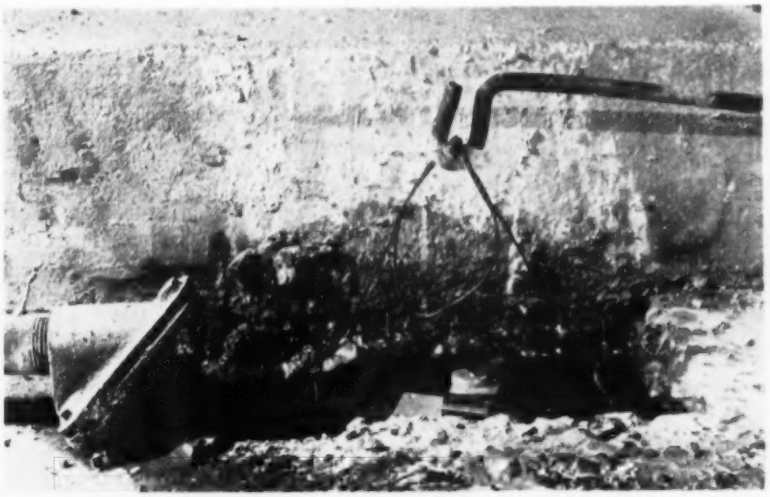
Design Factor—Method of as-



SOUND JOINT: Enlarged sectional view shows brazed joint made with Alumibraze alloy in ¼-in. thick 61S-T6 aluminum alloy.



BRUSH ON PASTE: Filler metal brushes on joint for easy application. Paste is dehydrated and set by preheating before brazing.



DIP IN BRAZING BATH: Binder dissolves to let filler metal flow by capillary action. Metal wets and bonds only in joint area.

Brazing with paste filler cuts assembly time for strong bond

sembly depends on the joint design and configuration of the individual parts. Insofar as possible, all parts should be self-locating so that they can be staked, tacked or spot-welded during assembly to simplify holding fixture design.

The design of fixtures is important in the success and economy of any dip brazing process. The molten flux must run off rapidly to reduce the amount of flux adhering to the fixture and parts after removal from the bath. All assemblies must be vented and ported to permit air expansion and rapid flux drainage.

Generally, springs provide the most useful hold-down devices because they produce a positive holding action and yet enable the parts to expand under heat without distortion. Screws and bolts are avoided as hold-down devices since the flux will solidify in the threads.

If the hold-down pressure is applied over a relatively small area, stainless steel shims or spacers should be inserted to protect the aluminum part from marring.

Light Fixtures—The mass of the fixture should be as light as possible to minimize heat absorption from the flux bath. Fixtures are usually fabricated from high-heat resistant alloys such as Inconel-X, half-hard 301 stainless steel or their equivalents. Steels, such as 1025, 4130 and the like, should not be used because they react with the flux and produce scale which contaminates the flux bath.

For coil springs, music wire is acceptable. However, Inconel-X or equivalent is best for flat springs. Type 301 half-hard stainless steel can be substituted for the Inconel, but it will have substantially shorter service life.

The filler metal is prepared by adding enough water to produce a thick but workable paste. If the paste is too thin, adding of powder will thicken it. But pouring off of excess water is not desirable since some of the flux (which is water soluble) would be lost. Since the paste tends to settle out upon standing, thorough stirring is needed to maintain uniform dispersion before it is applied to the joint.

Alumibraze can be applied with a stick, spatula, glass rod, small brush or even a syringe. The proper application can usually be gaged after a few trial runs.

Pre-heat First—Before the assembly is brazed, the parts and fixtures are preheated almost to brazing temperature. This accomplishes three things. First, it dehydrates the assembly, so as to prevent the formation of steam in the flux bath. Second, it "sets" the flux cement which binds the filler metal firmly in place. Third, by being close to brazing temperature, the parts can be brazed with a minimum dwell time in the flux and with minimum heat drain from the bath.

The preheating is done in a circulating air oven, maintained at 1000°F. The preheat period depends on the time needed to bring the batch of parts and fixtures up to temperature.

The brazing bath, an Alcoa No. 34 dip brazing flux or its equivalent, is maintained at 1100°F±5°. The assemblies are dipped directly into the bath upon removal from the preheating oven, so that they won't cool down appreciably. If the parts are too cool, the flux may solidify on contact, clog small openings and prevent the filler metal from flowing readily.

Care In Brazing Time — The usual brazing time is from one to three minutes depending on the mass of the assembly. Wherever possible, the dwell time should not exceed three minutes, otherwise excessive alloying between the filler metal and the base metal occurs. The higher strength aluminum alloys are relatively more susceptible to this alloying and require particular care against over-long immersion in the flux.

The bath itself should have a ceramic liner and should be electrically heated by nickel immersion heaters. These materials are necessary since the flux is highly reactive with ordinary steel. The procedures for handling and maintaining the flux are about the same as for all aluminum fluxes.

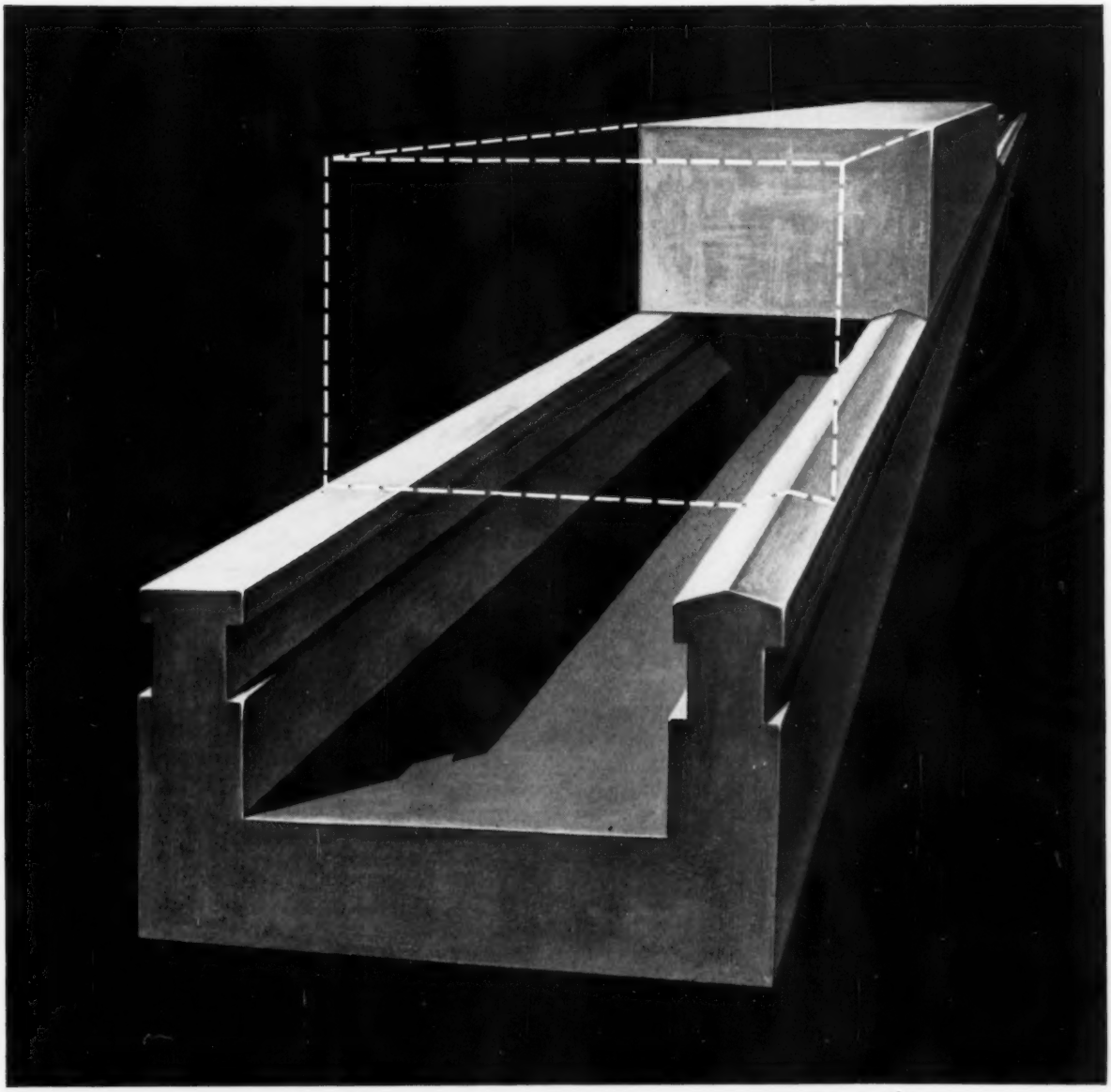
Flux Removal—A preliminary immersion in boiling water is done to remove as much flux as possible. But the assembly should be air-cooled enough to solidify the filler metal so that the joint can withstand the stress imposed by the thermal shock of the quench.

The quench should be done in an overflow tank to control the flux concentration in the wash water. A pressure spray or manual brushing will dislodge flux from accessible joints.

There is a choice of several acid treatments to remove the residual brazing flux. These treatments may be: a 30 pct nitric acid bath at room temperature for 10 to 20 minutes; a nitric acid-hydrofluoric acid bath at room temperature for 10 to 15 minutes; a hydrofluoric acid bath at room temperature for 5 to 10 minutes followed by a nitric acid dip (with a rinse in between); or a nitric acid-sodium dichromate bath at 150°F for 5 to 10 minutes.

In all cases, after the acid baths the parts should be thoroughly rinsed in clean water (one or two baths) and then dried. Agitation and turbulence improve the efficiency of any flux removal treatment and cut required immersion time.

Test For Residue—It is well to check for complete flux removal, since any remaining flux will react with the aluminum assembly. A convenient test is to place a drop of 5 pct silver nitrate solution on the cleaned and rinsed part. If any brazing salt remains, a white silver-chloride precipitate will form.



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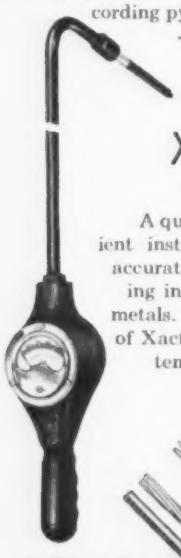

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 145.

Drill Chucks

Chucks and various other products for power drilling appear in a company's general catalog. It lists over 40 drill chuck models. Chuck arbors, keys, keyholders, adapters, and repair parts also appear. (Supreme Products Corp.)
For free copy circle No. 1 on postcard, p. 145

Tough Tubing

A leaflet gives data on a new type reinforced plastic PVC tubing. This tubing flexes to an angle of 90° over 1½ million times without cracking or breaking. It also bends around a 5/16-in. diam spindle without its internal bore being reduced. (Newage Industries, Inc.)
For free copy circle No. 2 on postcard, p. 145

New Equipment

An equipment company has just published an 8-page bulletin showing its latest models. Listed are units for chemical processing, mining and milling, rubber covering, laboratory testing and engineering. (Denver Equipment Co.)
For free copy circle No. 3 on postcard, p. 145

Plating, Processing

Automatic plating and processing installations that have been featured editorially in metalworking publications are illustrated in a 16-page folder. Anodizing, phosphating, printed circuit plating, barrel nickel plating, cleaning and pickling, zinc and cadmium plating, chromating, blackening and bright dipping are among the processes featured. An original article appearing in The IRON AGE on automatic zinc barrel plating is featured. (Frederic B. Stevens, Inc.)
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Tube-working Tools

An 8-page catalog features new tube-working tools. It illustrates and describes tools for flaring, burnishing, double flaring, cutting, bending and joining copper and JIC steel tubing. (The Weatherhead Co.)
For free copy circle No. 5 on postcard, p. 145

Gage, Control Unit

A bulletin offers data on a new mounting arrangement for one maker's measurement and control equipment. It recommends the units where measuring, control, and classifying setups become integral parts of data reduction, readout, and management control systems. (Industrial Nucleonics Corp.)
For free copy circle No. 6 on postcard, p. 145

Heat Exchanger Tube

Design and cost factors involved in building heat exchangers are discussed in a booklet. It gives a rapid analysis of comparable costs between plain condenser tube and a manufacturer's own low-finned tubing. The fins for these heat exchangers are approximately 1/16-in. high and are produced by an extrusion process directly from the wall of the tube itself. The bond

between the fin and tube is homogeneous; it offers no resistance to the flow of heat, nor can it loosen or deteriorate with time in any way. (Wolverine Tube Div., Calumet & Hecla, Inc.)

For free copy circle No. 7 on postcard, p. 145

Aviation Services

Complete information on various aviation divisions of a large company appears in a 32-page booklet. Products and services available through these divisions are detailed. (Kelsey-Hayes Co.)

For free copy circle No. 8 on postcard, p. 145

Surface Plates, Etc.

Precision surface equipment for tooling, production operations and welding is described in a folder. Included is information on new three point suspension surface plates, magnesium and semi-steel straight edges, parallel straight edges and dove-tailed straight edges. (The Challenge Machinery Co.)

For free copy circle No. 9 on postcard, p. 145

Magnet Chuck Controls

Control units for demagnetizing low-voltage (24-v dc) magnetic chucks is described in a bulletin. It tells how the units make possible 7-second demagnetization on up to 4000-w chucks. (Sundstrand Machine Tool Co.)

For free copy circle No. 10 on postcard, p. 145

Corrosion-Proofing

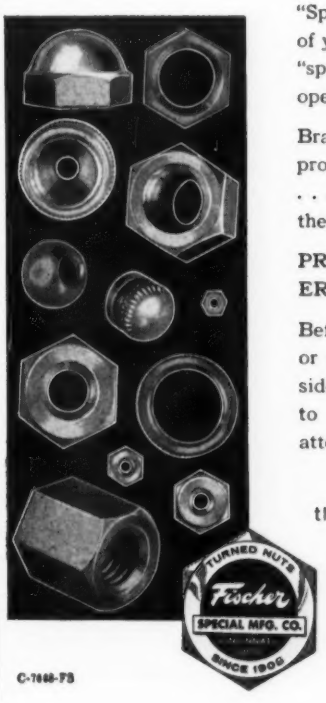
How a maker of corrosion-proofing materials doubles as a contractor is told in a bulletin. It explains that the firm has developed not only many types of cements, linings and coatings, but also methods of using these. Thus, it doesn't "farm out" corrosion-proofing jobs to inexperienced contractors; rather, it employs its own men, experts in various fields who have practical experience with the company's materials. (The Atlas Mineral Products Co.)

For free copy circle No. 11 on postcard, p. 145

Castings

Castings of many types, in different materials, appear in a bulle-

Fischer produces "specials" everyday!



C-7648-78

"Special" is our middle name. Regardless of your nut requirements, Fischer produces "specials" that will speed your assembly operations . . . and cut your costs.

Brass or Aluminum . . . your nuts will be produced on unique high-speed machinery . . . turned to exacting specifications . . . thereby eliminating "blanks" or rejects.

PRICE . . . you pay no premium. DELIVERY . . . it will be prompt.

Before you place that next order for brass or aluminum nuts . . . the ones you consider "special" . . . send your specifications to Fischer. You will receive immediate attention for price and delivery quotations.

there's no premium for precision with

Fischer

FISCHER SPECIAL MFG. COMPANY

445 Morgan St. • Cincinnati 6, Ohio

The PROOF of DSC STEEL is in its PERFORMANCE on your job

Say you are a fabricator of stampings* that are *chrome-plated* after having been *formed and/or drawn* out of Flat Cold Rolled Steel—

Here's HOW DSC DEEP-ROLLED RBF STRIP Can Cut Your Fabricating, Polishing and Chrome-Plating Costs

HAVE YOU CHECKED YOURS LATELY?

Using *non-strip* material for the kind of work mentioned above? Then there is a possibility that your fabricating, polishing and chrome-plating costs may be greater than need be. At least that has been the experience of typical DSC customers before they switched to DSC DEEP-ROLLED RBF STRIP.

WHAT MAKES DSC DEEP-ROLLED RBF STRIP DIFFERENT

Simply stated, it's the way it is made. Even though we explained it completely, we would hardly expect to convince you by ad talk. You have to see the difference yourself . . . *on the job*. We'll make it easy for you to make a test anytime you say.

WHAT YOU'LL DISOVER IN A TEST

DEEP-ROLLED RBF brightness isn't likely to break out in a "pepper and salt" rash, even under severe deformation. Rejects and breakers are practically nil. Your plating dollar will go further . . . and give you a better looking product in the bargain.

WHAT DEEP-ROLLING DOES

RBF STRIP is "The Sure-Working Steel with Eye-Appeal." Its quality comes from the *depth* of cold reduction it gets . . . on bright rolls *all the way, from first pass to last* . . . besides, of course, a final bright pass in temper mills.

That's why RBF brightness is more than "skin deep." And Deep-Rolling, the DSC way, improves grain structure, gives the steel deeper, surer working advantages.

WHAT DSC DEEP-ROLLED RBF STRIP OFFERS YOU

RBF STRIP is a product of 35 years of successful stripmaking. But we don't claim it to be a cure-all. We do say this—when RBF is *compatibly* mated to a job of yours, it offers you the opportunity for appreciable savings in your *over-all or job-run* costs.

Among DSC customers who are benefiting in this way are manufacturers of auto radiator grilles, mouldings, accessories; toasters, broilers, other small appliances; major appliance hardware and trim; housewares and other eye-appeal products.

HOW DSC WORKS

THE JOB FACTS COME FIRST. A DSC Customer "Rep" sees you about the possibilities. You decide whether you want your operating people to meet ours . . . and when. The closer the team work, the better the results.

How about getting started . . . real soon?

**Also tubing, mouldings and other roll-formed products.*

DSC MILLS AND PRODUCTS

PORTSMOUTH DIVISION, PORTSMOUTH, O.

Coke • Coal Chemicals • Pig Iron
Basic OH Steel Ingots • Blooms • Slabs • Billets • Rods
Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand
Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

AMERICA AND STEEL GROW TOGETHER — STEEL CENTENNIAL 1857 1957 — DETROIT STEEL DSC

Customer Satisfaction Is Our Business

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York, St. Louis, Toledo, Worcester, Mass.

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FREE LITERATURE

tin. It's a 4-page publication put out by a big job shop that claims "each job processed is a special job." (Kutztown Foundry & Machine Corp.)

For free copy circle No. 12 on postcard, p. 145

Boring Bars

Over 330 standard general purpose boring bars are listed in a 38-page catalog. It presents a comprehensive range of newly designed standard single tool and two tool boring bars, boring bar sets and accessories. (DeVlieg Machine Co.)

For free copy circle No. 13 on postcard, p. 145

Drum Cleaning

Removal of dirt, rust, paint and other foreign materials from drum exteriors, interiors and lids by blasting is described in a 4-page bulletin. It explains how automatic drum cleaning machine works. (Pangborn Corp.)

For free copy circle No. 14 on postcard, p. 145

Spring Clutches

Precision spring clutches are introduced in a bulletin. It explains advantages of this type clutch, illustrates actuation methods and describes typical installations. (Marquette Div., Curtiss-Wright Corp.)

For free copy circle No. 15 on postcard, p. 145

Refrigeration Tube

Tubing available to refrigerator makers is thoroughly reviewed in a 12-page folder. (Wolverine Tube Div., Calumet & Hecla, Inc.)

For free copy circle No. 16 on postcard, p. 145

Ceramic Seal

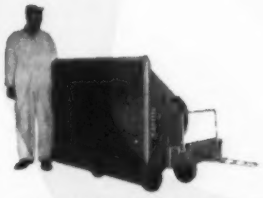
High-temperature, high reliability ceramic material for hermetic-seal applications is analyzed in a folder. It reports that the new product has: superior electrical characteristics, pressure integrity, high-heat capabilities. The ceramic bonds to stainless steel. (Consolidated Electrodynamics Corp.)

For free copy circle No. 17 on postcard, p. 145

Rocker Dumps

CUSTOM BUILT TRADE MARK

KD CARS to any capacity for any track gauge for manual or locomotive hauling. Custom-built.



RD TRAILERS of all types for handling loose bulk materials of any kind.

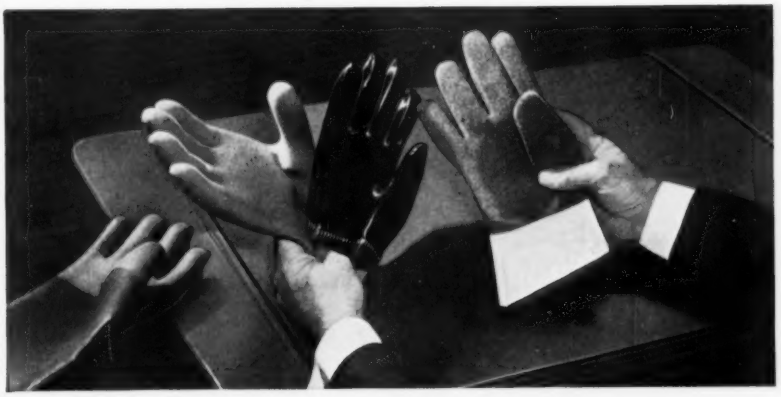
OUR 43RD YEAR

IT PAYS to insist on **EASTON** quality when you buy **rocker dump** cars or trailers. You **pay less in the long run. EASTON cars are built to stand up through more years of dependable heavy service.**

EASTON®

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

A-1089



Saved 6c of latest pay hike

• **Case No. 207:** In a large sheet steel fabricating plant (name on request) hand injuries and infections became so frequent that management, for the first time, job-analyzed the gloves worn by employees. Result: Canvas and unsupported rubber gloves were replaced with Edmont *job-fitted* gloves of coated fabric which not only reduced hand injury rate 78% but wore 3 to 5 times longer, at a direct saving of 6¢ per man-hour.

Adoption of modern *job-fitted* gloves usually results in savings to companies or employees of 40% to 70% of glove costs, with fewer hand injuries, better work handling and job attitude.

• **Free Test Offer to Employers:** Send brief description of your operation, materials handled, temperature condition. Without cost, we will recommend correct gloves and supply samples for on-the-job test.

Edmont Mfg. Co., 1234 Walnut St., Coshocton, Ohio, world's largest maker of coated fabric gloves.

Edmont

JOB-FITTED GLOVES

Edmont

Something new...
made better
by aluminum

Loaded aluminum cars were crashed together again and again at Aluminium Limited's laboratories in Kingston, Ontario. Even a million pounds of impact failed to damage these rugged cars.

New aluminum hopper cars withstand million-pound punch ...increase payloads up to 16%

WITH ITS GREAT SUCCESS in new passenger trains, it was natural to think of aluminum for freight cars. Aluminum cars would mean heavier payloads . . . trains 16% longer hauled by the same locomotive. Lightweight cars would also reduce track wear and switching costs. And, of course, aluminum's corrosion resistance would provide substantial maintenance savings.

Tests Prove Strength

But would aluminum cars be rugged enough for this service? The answer—a definitive *yes*—was uncovered by Aluminium Limited's research facilities. In recent tests aluminum hopper cars withstood up to a million pounds of impact . . . far more than is ever encountered in a lifetime of service.

Growing Fabricator Markets

With all these advantages, aluminum is sure to play an important role in modernization and replacement programs for America's fleets of 2,000,000 freight cars. With this and other structural applications, aluminum fabricators are sure to find ever-increasing markets.

Through research and engineering, Aluminium Limited is continually working to develop new uses and markets for aluminum. To match the growing demand, production capacity in Canada is expanding to reach a level of 1,000,000 tons annually by 1960.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • DETROIT • LOS ANGELES • BUENOS AIRES • SÃO PAULO

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Steam Cleaner

Three direct-fired steam cleaners are outlined in a 4-page brochure. In addition to illustrations, the bulletin carries a table of specifications for each. Also covered are optional features. (Kelite Corp.)

For free copy circle No. 20 on postcard

Vacuum Furnaces

A bulletin announces a new line of standard vacuum furnaces available for either single or double pump vacuums. Double pump, pit, or bell type furnaces are built to operate at temperatures to 2100°F. Single pump vacuum retorts utilized in bell, pit, box, or tube type furnaces are not recommended for applications where temperatures above 1600°F are required. Full details of the standard single and double pump vacuum furnaces appear in the bulletin. (Hevi-Duty Electric Co.)

For free copy circle No. 21 on postcard

Car Shaker

How a new car shaker increases unloading volume up to 750-pct is described in a bulletin. The shaker is designed for safe, fast, economical pushbutton unloading of granular material from open, hopper-bottom gondola cars. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 22 on postcard

Wire Rope

Inspection of wire rope, methods of lubricating it, use and abuse of wire rope, and sheave maintenance are a few of the features covered in the manual prepared by one manufacturer. In addition, there are sections devoted to strengths and weights of wire rope, cable assemblies, and rated capacity of slings. (Macwhyte Co.)

For free copy circle No. 23 on postcard

Protective Closures

Caps and plugs (both rubber and plastic closures) for protecting, sealing or masking threaded parts, pipe ends or tubing are described in a brochure. It covers seven styles of stock sizes. (Shurclose Seal Co.)

For free copy circle No. 24 on postcard

Fasteners

High-temperature fasteners, having very high static tensile and fatigue strengths at temperatures up to 900°F, are reviewed in new literature. The tension bolts are of the 12-point external wrenching type. Sizes range from ¼ to 1½ in. diam. (Standard Pressed Steel Co.)

For free copy circle No. 25 on postcard

Motor Starters

Manual motor starters are dealt with in an 8-page publication. It covers new small-size manual starters for fractional- and integral-horsepower motors up to 7½-hp. (General Electric Co.)

For free copy circle No. 26 on postcard

Screw Machine

Single-spindle automatics are covered in a folder. It shows how the 1⅝ and 2½-in. machines work. The 4-page publication recommends the units for producing shafts, arbors, spindles, studs, pins, axles, etc. (The Cleveland Automatic Machine Co.)

For free copy circle No. 27 on postcard

Ball, Roller Bearings

An 88-page book includes an 18-page engineering section on Anti-Friction Bearing Mfg. Assn. terminology. It also tells how to select ball thrust bearings, how to calculate thrust load capacities for any speed, and how parallelism and flatness affect thrust bearing performance. Included, too, are: (1) data on fits and tolerances, (2) for-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 9/12/57

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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
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FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
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Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD

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NEW YORK 14, N. Y.

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State .....

FREE LITERATURE

mulas for calculating thrust loads for various gear drives, (3) oil and grease lubrication methods, (4) a grease selection guide, and (5) how to handle and care for bearings. (Aetna Ball & Roller Bearing Co.)

For free copy circle No. 28 on postcard

Handling Controls

Controls for one maker's electric walkie-type materials handling trucks are described in a circular. It explains features and operating details of the controls. Available as standard equipment on both high and low-lift models, the controls offer both dynamic braking and controlled plugging. (Lewis-Shepard Products, Inc.)

For free copy circle No. 29 on postcard

Pneumatic Conveying

Stationary and portable pneumatic conveying systems are outlined in a bulletin. These systems cover a capacity range from ¾ through 10 tons per hour. Also described are vacuum producers from 5 through 75 hp and hose or pipe sizes from 2 through 7 in. Conveying under both pressure and vacuum is covered. (Spencer Turbine Co.)

For free copy circle No. 30 on postcard

Manual Motor Starter

Eight page booklet covers new small-size "100 Line" manual starters for fractional- and integral-horsepower motors up to 7½-horsepower. It gives new features, application and installation data, and a rating table for the new plug-in heaters. (General Electric Co.)

For free copy circle No. 31 on postcard

Blind Rivets

Describing a new conical keystone lock blind rivet is a 16-page publication. It explains features of the rivets with easy-to-follow drawings showing their step-by-step driving cycle. The fasteners come in standard diameters in brazier head and countersunk head types, and the oversize diameter countersunk head type. (Huck Mfg. Co.)

For free copy circle No. 32 on postcard

Handlers' Radio

Interested in modernizing your materials handling operations with two-way radio? If so, a new 6-page folder contains information regarding FCC licenses and types of equipment available for various applications. The bulletin describes a low-power industrial unit, specifically designed for use on gasoline or battery-powered materials handling vehicles. (General Electric Co.)

For free copy circle No. 33 on postcard

Grind Wheels

Center-type grinding wheels are covered in a booklet. It lists many features and applications of these wheels. (Milling Products Div., Cincinnati Milling Machine Co.)

For free copy circle No. 34 on postcard

High-Heat Alloy

Metallurgical and design data on Chromel-A is offered in a catalog. This material is an 80-20 nickel-chromium resistance alloy, widely used in high temperature electrical heating applications. The 20-page publication includes specifications on the alloy in resistance wire, ribbon and furnace strip form. (Hoskins Mfg. Co.)

For free copy circle No. 35 on postcard

Bending Unit

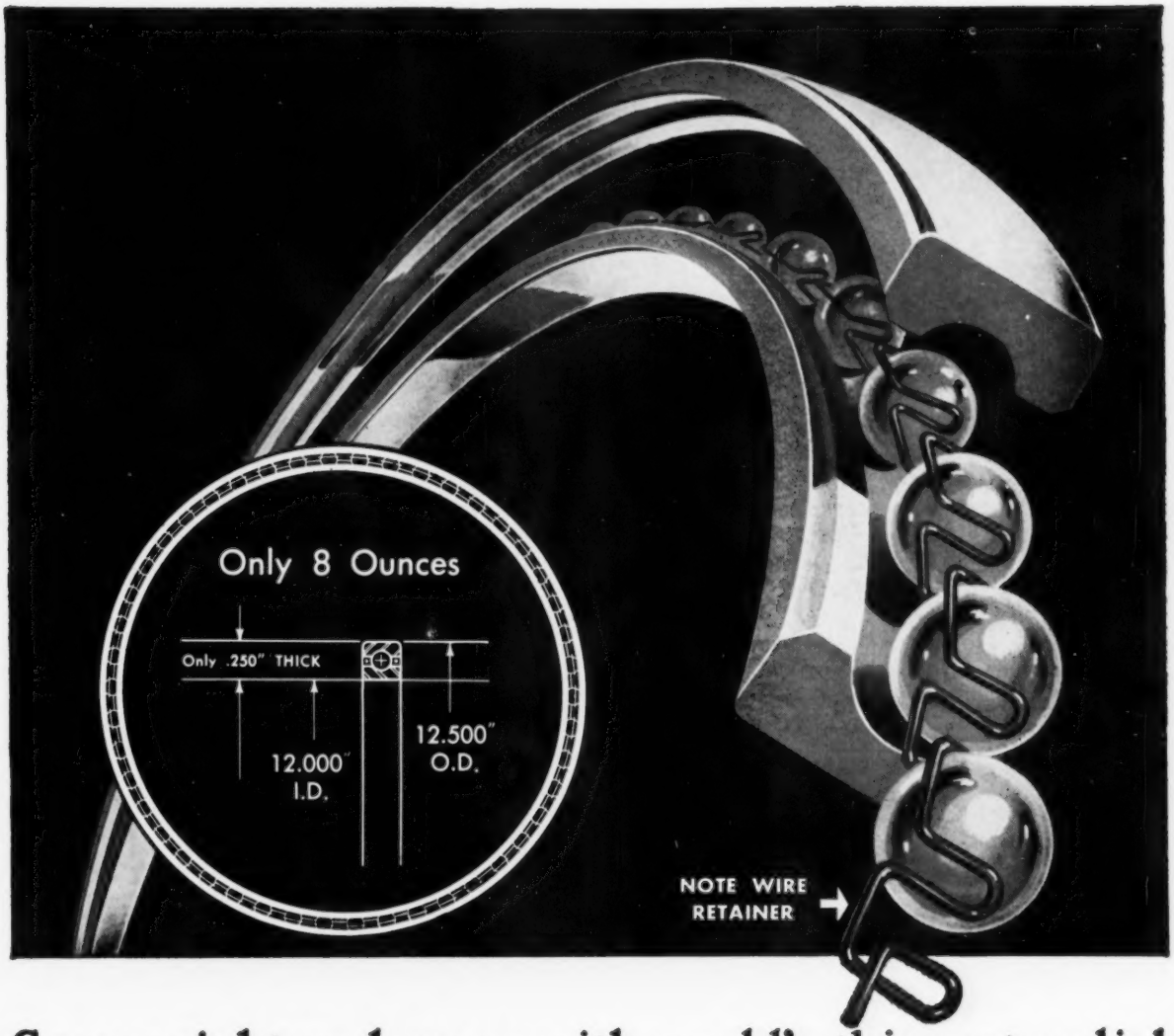
Automatic bending machines are outlined in new literature. These production benders make smooth, neat bends at relatively high speeds. (Pines Engineering Co., Inc.)

For free copy circle No. 36 on postcard

Wire Rope Abrasion

Wire rope abrasion is discussed in a bulletin. The publication describes principal causes of this enemy of wire rope. It lists numerous practical suggestions for minimizing destructive effects. (Leschen Wire Rope Div., H. K. Porter Co.)

For free copy circle No. 37 on postcard



Save weight and space with world's thinnest radial ball bearings—*Reali-Slim* by Kaydon

HERE it is! A *Reali-Slim* radial ball bearing with a wire separator that has just short of a full complement of balls for maximum capacity. What's more, you still get all the advantages of a separator between the balls. This design also gives you a bearing that's light-in-weight and is, without a question, the thinnest bearing ever built in this diameter.

Whatever your product design, there's a small or large diameter *Reali-Slim* bearing that can be the right answer to your thin-section bearing problems.

The radial ball bearing, illustrated here, is *really slim* — 12.000" I.D., 12.500" O.D., .250" thick . . . *and weighs only eight ounces.* It has 9,810 lbs. static load capacity, 1,256 lbs. at 100 rpm. Kaydon is able to produce *Reali-Slim*, high-precision bearings because Kaydon specializes in the unusual.

Kaydon bearing engineers are prepared to give you valuable help with technical, thin-section bearing problems.

For detailed information on Kaydon's *Reali-Slim* line, ask for engineering catalog No. 54-RS3 detailing:

Reali-Slim Ball Bearings — Conrad, angular contact and 4-point contact types in seven standard cross sections from ¼" to 1.000" and in bore diameters from 4" to 40".

Reali-Slim Roller Bearings — Radial and taper roller types in cross sections from 9/16" and in bore diameters from 5" to 40".

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

K-561

All types of ball and roller bearings — 4" to 120" outside diameter . . .
Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Needle Roller • Ball Radial • Ball Thrust Bearings.

SANTOS DUMONT was NEWS

Santos Dumont was not a place, but a person — from Brazil. He gained a great deal of attention in 1907, when he flew an aeroplane a distance of 235 yards in 21 seconds — carrying a passenger! This historic flight took place in Paris, and was "news" all over the world. Curiously enough, few people at that time were aware of the Wright brothers' history-making flight at Kitty Hawk in 1903; most people then thought of "aviation" as floating about in balloons or dirigibles. It was something you watched at the County Fair — or perhaps at the International Bennett Cup Race.

In this era of scientific and industrial pioneering, our founders Soren Sorensen and John Christensen came west to Cincinnati and started making gears. Cincinnati Gear's beginning was as modest as the aviation industry's; and like the aviation industry, we have grown and progressed significantly in the past fifty years. But one thing has not changed — our old fashioned attention to detail, that insures our gears being 100% *right* every time. It results in a reliability and dependability that our customers like — that *you'll* like too. Why not try us for your next custom gear order?

THE CINCINNATI GEAR CO.
CINCINNATI 27, OHIO
Fifty Years of "Gears—Good Gears Only"

CINTI

You Arbitrate It!

THE PAINTER WHO GOT THE BRUSH-OFF

From the files of the American Arbitration Association

Hans K., a maintenance painter in an auto body plant, was naturally concerned when he heard rumors about the company going out of business. He was relieved, however, when official word came down that the plant was merely suspending operations for several months for extensive alterations. Management explained that a few of the men would be offered laboring jobs, at laborers' pay, during the interim period, but that all employees would get their old jobs back at their regular rates when production was resumed. This was all put into writing and became a supplement to the collective bargaining agreement.

Hans was one of the lucky ones who got a common labor assignment. Before the work was finished, however, he was told that he would be an exception to the general rule about reinstatement to former jobs.

"I'm sorry," the foreman explained, "but the walls are going to be covered with a new processes material that doesn't need to be painted. The home office decided that the small amount of trim that takes paint can be maintained more economically by an outside contractor who will be called in when needed. Won't need a maintenance painter of our own any more."

The union took the case to arbitration where witnesses proved that Hans had been promised his job back. The company didn't deny it, but rested its case entirely on a management prerogative clause which gave the company the right to decide which jobs were necessary. "As long as we have sound business reasons for abolishing this job and are not discriminating against anyone, we're in the clear," the personnel manager said. How would you rule?

The Arbitrator Ruled:

The arbitrator supported the company position. The supplementary agreement, in assuring return of employees to their jobs, implied that those jobs would still

The Arbitrator Ruled:

be there. Where a job is abolished for genuine business reasons, he said, the employee concerned could not be guaranteed his old job or rate. The company, on receiving the award, indicated that Hans K.'s seniority would be recognized in the form of preferential treatment when an opening occurred for promotion to a better-paying job.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony and other facts involved.

NEW BOOKS

"Financial Approach to Industrial Operations" is a short treatise on the subject. It discusses when you should spend, how much, and when to expect a return. 23 pp. $1.50 per copy. Research Div., Society for Advancement of Management, 74 Fifth Ave., New York 11.

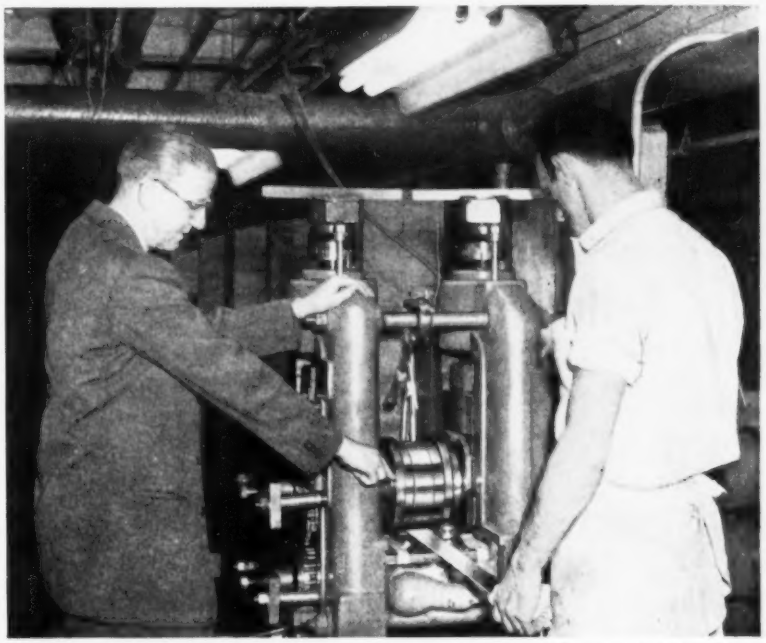
"Control of Steel Construction to Avoid Brittle Failure" is a multi-authored work. Hence, it seems to disagree with itself sometimes. This is understandable with a subject like brittle failure; present knowledge on it is pretty limited. In general, however, it gives a complete view which might not be possible from even the most openminded single author. 184 pp. Welding Research Council, 29 W. 39th St., New York.

"Water and Air Pollution" is a general study of problems and answers. It includes some material directly concerning metalworking firms. 220 pp. $3 per copy. Organisation for European Economic Co-Operation. 2000 "P" St., N.W., Washington 6, D. C.

"Metallurgical Works in Canada" covers principal plants for treating nonferrous and precious metals. It's

Continued on Following Page

Proof of Vulcan Tool Steel Superiority



Cold rolling of critical heat resisting alloy stator vanes at D.E. Makepeace Company, Attleboro, Mass.

Vulcan Service PLUS TCM Steel solves tough rolling problem on jet stator vanes

Vulcan sales engineers, working closely with the tool experts of D. E. Makepeace, faced a tough and exacting problem: How to increase the service life of rolls used in cold rolling critical jet engine heat resisting alloy stator vanes.

As a result of joint investigations, design changes were recommended and adopted. The result? Roll life was multiplied.

Vulcan engineers went further. Despite the fact that other grades of tool steel had been tried and found unsatisfactory, Vulcan engineers predicted that *additional* improvements could be made by using Vulcan TCM steel. This recommendation, too, was adopted. The result? The already increased roll life was *trebled*. Net result: substantial savings with increased roll life, less down time and greater productivity.

This same engineering help is available to you without charge. For the name of your nearest Vulcan representative, write, wire or call collect. Vulcan Crucible Steel Division, H. K. Porter Company, Inc., Aliquippa, Pa.

H. K. PORTER COMPANY, INC.
VULCAN CRUCIBLE STEEL DIVISION

abrasion...
is this your wire rope problem?

LESCHEN wire rope experience solves this problem for you in "*Red-Strand*" Bulletin 101

SEND FOR YOUR COPY TODAY—You'll find this bulletin full of practical suggestions for minimizing the destructive effects of abrasion on wire rope you use. That means longer useful life, less down time, lower costs. These suggestions are in simple, non-technical language, easy to follow, yet technically sound...based on the same full century of rope making experience that insures consistent top quality in every foot of *Leschen Red-Strand Wire Rope*. So write for Bulletin 101 today. At the same time, ask for free engineering counsel on any other wire rope problem you may have experienced. Address: Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Missouri.

LESCHEN
Red-Strand

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

NEW BOOKS

part two of a series of pamphlets 21 pp. 25¢ per copy. Dept. of Mines & Technical Surveys, Ottawa, Canada.

"Handbook of Hard Metals" deals with the scientific principles of sintering and the technical production of hard metals. 162 pp. $10 per copy. Philosophical Library, 15 E. 40th St., New York 16.

"The Role of Air Freight in Physical Distribution," studies the advantages of air transit. It suggests that top decision makers re-examine facts about shipping via air; this is because they're losing money by comparing present-day shipping and warehousing ideas with yesterday's air freight facts. Such an assumption is debatable. 179 pp. $2.50 per copy. Harvard Business School, Research Div., Soldiers Field, Boston 63, Mass.

"The Story of Cold Finished Steel Bars," by F. J. Robbins, president of Sierra Drawn Steel Corp., is mainly a textbook for steel warehousemen. It traces the history of cold finished steel from ancient times through the industrial revolution to the present day. The book might serve as an introduction work for new people in the field or as "refresher course" for others. $1 per copy. American Steel Warehouse Assn., Cleveland, Ohio.

"Assuring Adequate Reserves of Key Personnel" studies a subject close to every top management man's heart. It follows this line of thought: A firm's success depends on management's ability to make sound decisions and carry them out. Without good managers, trainees and technicians, a company falls apart. And you can't keep pirating men from other sources. You've got to grow them at home, too. It then tells how some outfits develop management talent. 72 pp. $1.75 per copy. ($1 for members.) American Management Assn., 1515 Broadway, New York 36.

Electric Motors Scorn Smoothness, Silence

Most users of electric motors want them to operate as smoothly and silently as possible.

But these virtues are considered vices by some motor operators. They'd rather the units shake violently.

▪ Although electric motors are usually expected to run smoothly and silently, some users would rather that they shake, rattle and rock on their foundations. To satisfy these motor operators, a large producer of electrical equipment is supplying what it calls "Rock 'n Roll" motors.

The producer, Westinghouse Electric Corp.'s Sunnyvale, Calif., plant, turns out such unusually sturdy units for many uses. The motors virtually scorn some of the usual virtues of such equipment.

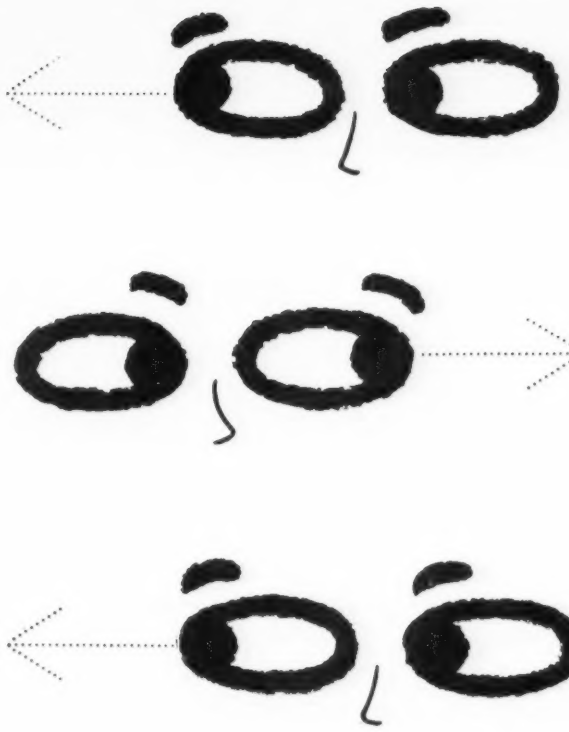
Go Into Vibrators—Made in ¼ and 1-hp sizes, the motors go into vibrating screen separators produced by Southwestern Engineering Co., Los Angeles.

In operation, the separators receive material on vibrating screens of the desired mesh. Depending upon the specific job, desired or unwanted parts of materials may be retained on the shaking screens or passed through the fine mesh. If desired, several screens of different mesh may be used.

Shakes, Tumbles—To effect the shaking and tumbling motions

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 145. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



Alternating stresses bear watching!

Back and forth . . . up and down . . . in and out . . . if those stresses keep changing, the life of a metal part is a hard one . . . and often a short one. Stress reversals can cause "fatigue" failure at stresses far below the expected strength of the metal.

One of the outstanding properties of phosphor bronze is its high resistance to fatigue failure. It is widely used for electrical switch parts, relay contact springs, bellows, rotating shafts and other moving or vibrating parts.

For detailed information on phosphor bronze, write to Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.

ALLOY METAL WIRE
Prospect Park, Pa.

RIVERSIDE METAL
Riverside, N.J.

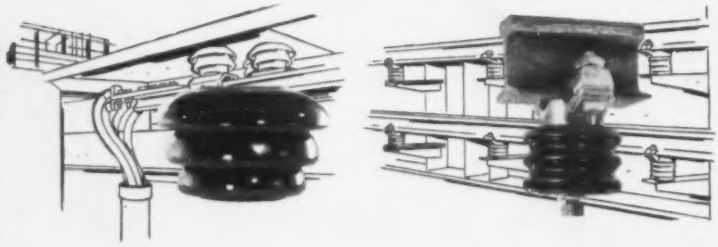
PRENTISS WIRE MILLS
Holyoke, Mass.

H. K. PORTER COMPANY, INC.
RIVERSIDE-ALLOY METAL DIVISION

STRENGTH

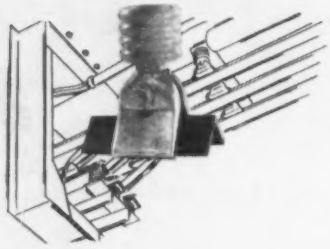
Which kind of strength do you need in insulators for traveling-contact equipment?

MAXIMUM ELECTRICAL STRENGTH



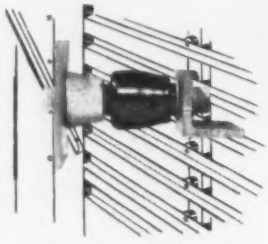
Wet-process porcelain insulators, such as these, offer outstanding electrical properties for high-voltage contact-rail insulation. Especially recommended where dirt, moisture, and other contaminants prevail.
Also available are dry-process porcelain units for power circuits.

MAXIMUM IMPACT STRENGTH



Molded polyester-fiberglass insulators and fabric-reinforced insulators of this general type have exceptional impact strength and vibration-resistance combined with good electrical properties. Tailored to resist chemicals, thermal shock, weathering.

MAXIMUM TENSILE STRENGTH



Molded Giant Strain insulators, adaptable to miniaturization where space is restricted, offer unusual mechanical strength. A very economical insulator having diverse applications.

TO HELP YOU DECIDE

. . . on the right combination of properties to meet your insulator needs, Delta-Star engineers from coast to coast invite your problems. Phone the nearest Delta-Star district office or write to Electric Service Works, Delta-Star Electric Division, H. K. Porter Company, Inc., 17th & Cambria Sts., Philadelphia 32, Pa.

H. K. PORTER COMPANY, INC.
DELTA-STAR ELECTRIC DIVISION

necessary for screening and separating jobs, eccentric weights are attached to both ends of the shaft extending through the motor. This is mounted directly below the screen. Location and mass of these weights determine direction and degree of the motions imparted to the screen. Spring mountings prevent vibration of the motor-screen assembly from being transferred to the separator base, hence to the room or building in which the machine is used.

Using the separators, manufacturers assure uniform particle size for ores, cement, porcelain, clays, sand, gravel, paint, pigments, etc.

Basket Holds Coils For Cleaning

In the cleaning of refrigerator evaporator coils, Carrier Corp., Syracuse, uses special baskets to hold the coils. The metal alloy used in the baskets was developed to withstand corrosive conditions of degreasing and cleaning processes.

Coils are kept in this basket during dipping.

Long-Lasting Service—Made by Wiretex Mfg. Co., Inc., Bridgeport, Conn., the baskets have been in service at Carrier since 1953 with no maintenance or repairs required. The baskets are equipped with 5/8-in. diam rods, scalloped and

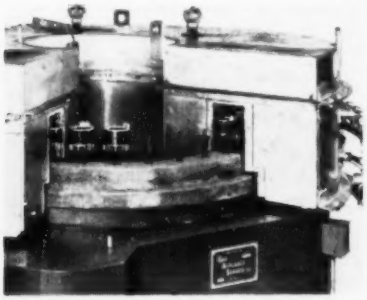
adjustable to hold 30 to 40 coils through the entire cleaning cycle.

Specifications of the basket are as follows: Dimensions: 45 x 30 x 12 in. deep. Construction: 4 mesh wire 0.080-in. diam; ½-in. diam rod frame with ¾-in. diam rod handles.

Rotary Heating Unit Treats Rotors

A new heating unit is well adapted to the debonding (or normalizing) and blueing of rotors used in electric motors. It heats the periphery of the rotor to approximately 900°F to separate the die-cast aluminum from the steel laminations.

The heating blues the steel laminations. The shaft hole of the



Two-zone temperature control is a key feature of the unit.

rotor expands sufficiently to permit insertion of the shaft, which is locked into position when the rotor is cooled. Heating time is 3 to 4 minutes for a 4-in. diam rotor.

Developed by Gas Appliance Service, Inc., Chicago, the unit consists of a rotating refractory hearth ring with rotating fixture spindles. The donut shaped furnace chamber has multiple burners in the outer periphery. The furnace chamber operates at approximately 1600°F with two zone temperature control.

On 4-in. diam rotors, production is from 350 to 400 units per hour.

Heat Exchange Idea

An interesting proposal for approaching heat transfer and cooling problems is presented by the Heat

Profitable Trends in the use of Refractories

Photos courtesy of Atlantic Steel Company

New furnaces start right with Laclede-Christy Refractories

Specifications on Atlantic Steel Company's new 13" Bar and Rod Mill included a 90 ton per hour reheating furnace. They called on a leader in the field, Rust Furnace Company, to build it. Rust's experience and knowledge prompted their use of Laclede-Christy refractories.

The installation included Spallac super-duty fire brick which has proved its long-lasting qualities in other installations . . . requiring minimum maintenance and reducing downtime. Spallac super-duty features high refractory value, good volume stability, and high resistance to spalling. Also included was Laclede King high duty brick.

To start your furnace right—for new or replacement installations, it pays to use Laclede refractories. Call Laclede-Christy Works, Refractories Division, H. K. Porter Company, Inc., St. Louis 10, Mo.

LACLEDE-CHRISTY WORKS
REFRACTORIES DIVISION
H. K. PORTER COMPANY, INC.

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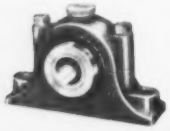
THE DRY FLUID DRIVE
100% efficiency at full load!



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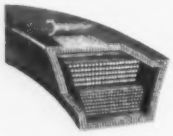
America's Quality Pillow Blocks!



SEALED-LIFE V-BELTS
The life is sealed in!

•

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- Roller Bearings. Load ratings, dimensions, etc. Bulletin A-638.
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DODGE MANUFACTURING CORPORATION
800 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

TECHNICAL BRIEFS

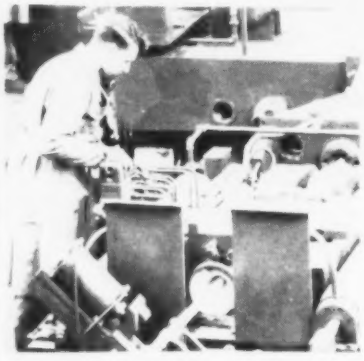
Transfer Div. of National-U. S. Radiator Corp. The company suggests that design engineers approach problems of heat transfer without limiting their thinking to specific kinds of equipment.

The firm, a manufacturer of both shell-and-tube heat exchangers and cast iron cooling sections, points out that advantages can be gained by giving full consideration to both types of equipment.

Unit Cold-forges Big-diam Screws

Hexagon head cap screws pour off a boltmaker's production line at a 40-a-minute clip, thanks to a new cold forging machine. The big boltmaker turns out 1¼-in. diam screws.

In use at Cleveland Cap Screw Co., Cleveland, the machine's primary job is producing large diameter cap screws and industrial fasteners. This is done automatically. It cold-heads hex-head cap screws, hex and square-head bolts, and high-



Stock feeding into this machine becomes 1¼ in. bolts.

strength structural bolts in sizes from ⅞-in. up to and including 1¼-in. diam, up to 10-in. long.

Still Another Use — But the Cleveland firm believes the greatest contribution of the giant boltmaker will be its as-yet untried ability to produce odd-shaped components far larger than any turned out before by automatic cold-forging.

In this area, the company expects the cold-forging unit to shoulder aside some machining and hot-forging methods in producing a variety of non-fastener industrial parts.

Works Special Parts? — These parts might include: pinion drive shafts, pump shafts, transmission shafts, insulator pins, big rivets, coupling bolts, ball-joint suspension parts, gear blanks, etc.

The expected ability of the machine to automatically produce such parts by cold forging is based on the company's long experience in making similar products of smaller size in boltmakers to ¾ inch in capacity.

How It Works—The process employed by the machine is known as the Kaufman double extrusion process. It consists of: (1) Using wire or rods larger than the nominal diameter of the finished fastener; (2) By a series of operations, reducing this wire or rod to a pitch diameter ready for rolling. The machine then automatically heads, points and roll-threads the fastener.

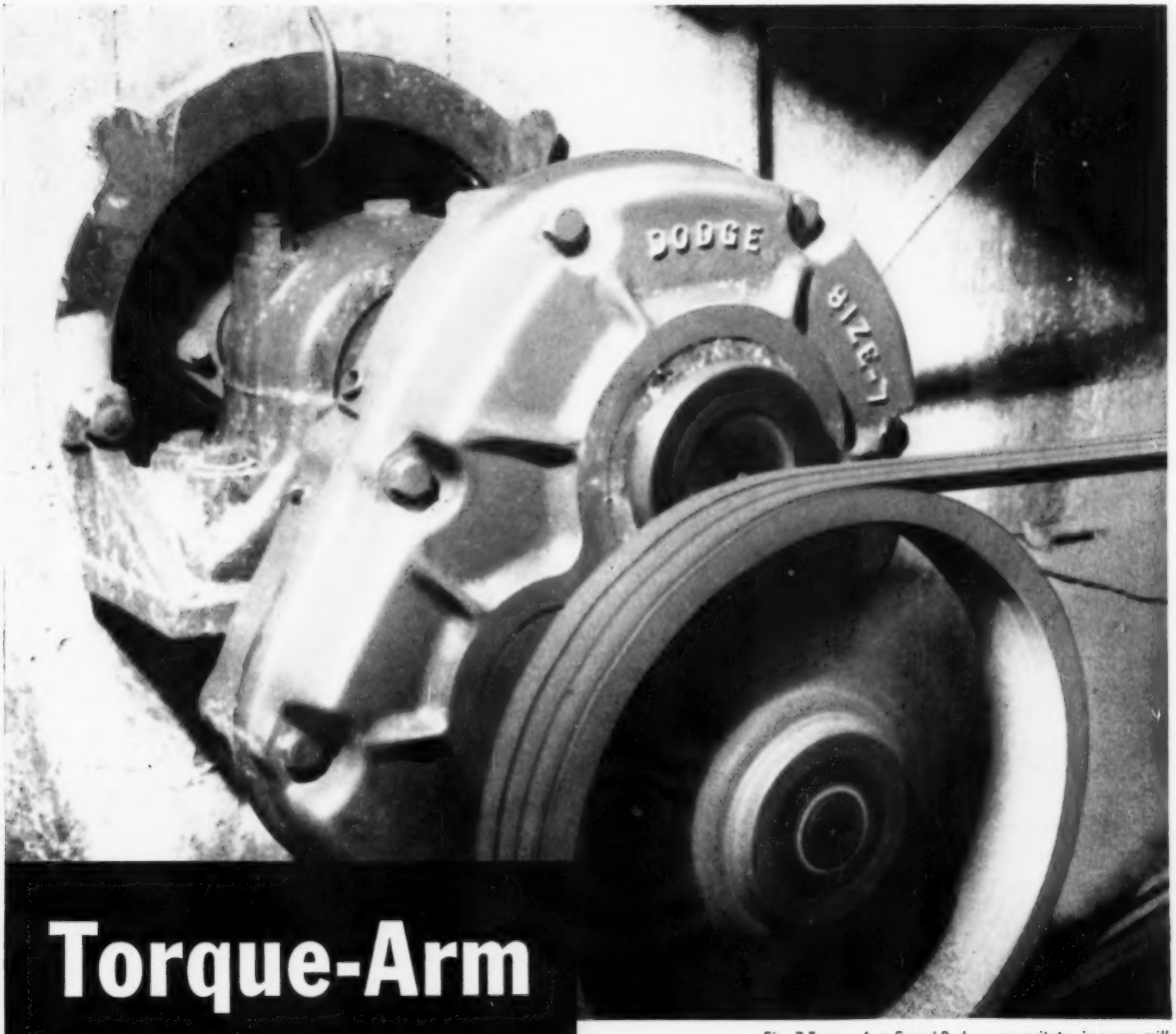
The boltmaker has variable-speed electronic controls. These permit the 200-ton unit to operate at any speed from 4 to 40 rpm. The boltmaker was built by National Machinery Co., Tiffin, Ohio.

Stamping Press Forms 2000 Parts An Hour

▪ A 450-ton stamping press in use by a large auto parts maker forms auto headlight shells from strip steel at a rate of 2000 an hour.

Installed and in operation at the C. M. Hall Lamp Co., Detroit, the press stamps out double units for new duel headlighting systems faster than single units were made before. Shells for the dual lamps previously were formed on a bank of single-station presses at a rate of about 500 pieces an hour.

The new press is fully automatic. Its capacity is twice the total of six

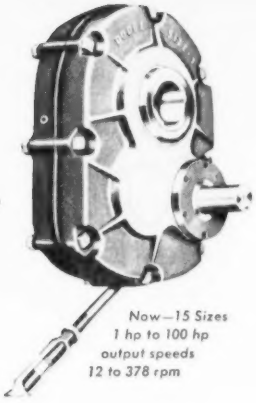


Size 7 Torque-Arm Speed Reducer on agitator in paper mill

Torque-Arm

SHAFT-MOUNTED SPEED REDUCERS

Save Up to 1/3 in Installation —Deliver 97% Efficiency!



Now—15 Sizes
1 hp to 100 hp
output speeds
12 to 378 rpm

Easy to install! Mounted directly on the driven shaft. Locked at both ends. Dodge Torque-Arm Speed Reducer requires no foundation, no flexible coupling, no sliding base, and there's no lining-up problem. Amazing economy is matched by efficiency in operation—up to 97%.

Unit is driven through V-belt drive. Stock Taper-Lock Sheaves prescribed for each job permit speed ratios required. Tri-Matic Overload Release and backstop available, if desired. Dodge Torque-Arm is America's most complete line of shaft-mounted Speed Reducers. Ask your Dodge Distributor—or write us.

•

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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your phone book—or write us.

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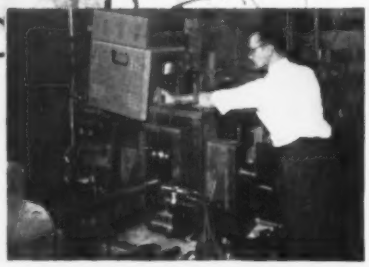
IS YOUR PLANT USING THE MOST MODERN INSPECTION TECHNIQUES?



Sperry Ultrasonic Reflectoscopes are found in the modern metallurgical laboratories of leaders in the metals industry. The Ultrasonic UW Reflectoscope is a new research tool that has proved its reliability and usefulness in the search for closer quality control . . . for new and better materials. Ultrasonic waves probe deep inside steel . . . nonferrous metals . . . ceramics . . . plastics–revealing even the smallest flaws and hidden internal defects. The Reflectoscope not only locates these flaws—it also determines their approximate size! In addition, it can even be used to determine elastic properties.

Automatic Ultrasonic Inspection of continuously produced steel strip and welded tube is one of the most recent Reflectoscope inspection techniques brought from laboratory to production line.

Does your laboratory have the latest, most efficient ultrasonic research equipment? Write today for complete information on the Sperry Ultrasonic Reflectoscope—a reliable testing method for most metals!

Regular Maintenance Inspection of production equipment, like this extrusion press, is a valuable extra duty which many owners assign to their Reflectoscope when the instrument is not required for lab and production tests.

To keep posted on latest developments in the profitable use of ultrasonic inspection, send for your free copy of our Ultrasonic Inspection News Letter. Write to:

Sperry

303 Shelter Rock Road Danbury, Connecticut

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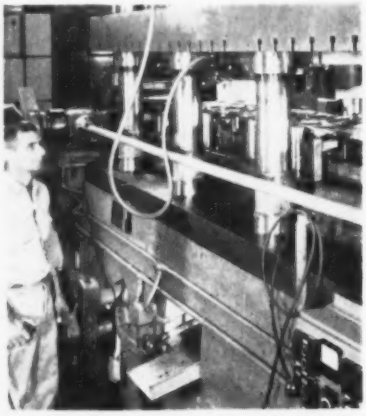
FIRST IN ULTRASONIC INSPECTION

TECHNICAL BRIEFS

older presses it replaces. It is 11-ft high, 16-ft long and 17-ft wide, including drive. It weighs 175,000 lb.

High Pressure — The 450-ton pressure rating is significant. This



Air cylinders atop this press provide draw-pad pressure.

pressure is required by the unusual size of progressive dies the machine is designed to handle—up to 36-in. wide and 170-in. long. These dimensions compare with the 28-in. width and 150-in. length of its predecessor 300-ton machines.

Vacuum Lift Handles Tank Heads Easily

Steel tank heads offered a fabricating firm some handling problems. Then it switched to using a special vacuum lift in conjunction with an overhead crane.

Previously, the fabricator was faced with this: it was necessary to weld lugs on each cover to make handling possible. Later, these lugs had to be removed. Now, however, a worker merely lowers the lift unit to the tank head. Switching on the suction provides a safe, sure contact. Then the crane takes over and moves the steel tank head.

Speeds Welding, Too—Not only does the vacuum lift make handling easier, and unnecessary welding nonexistent, but it speeds necessary

welding jobs. It saves time in fitting heads to tanks for joining. It also

Here, a worker places the vacuum lift on a tank head.

makes possible picking one head off a stack without lugs.

Manufactured by Vac-U-Lift Co., Salem, Ill., the lifting system handles items to 12-ft wide x 80-ft long, weighing 20,000 lb.

It employs the principle of induced vacuum in conjunction with special vacuum pads.

Belts Solve Foundry Maintenance Worry

A malleable iron foundry had maintenance problems with conveyor belts that carry hot shake-out sand from the shake-out unit to storage for later use.

Subjected to the hot (300°F) sand, the belts wore out quickly. They had to be replaced with new belts every three months—a costly operation. Time and money were also lost during the shutdowns when new belts were installed.

Calls for Help—The firm, I-F Mfg. Co., New Philadelphia, Ohio, then installed two hot material belts made by B. F. Goodrich Industrial Products Co., Akron, Ohio.

In the 18 months since then, the belts have been carrying the hot sand 24 hours a day, five days a week. There hasn't been a shutdown and practically no maintenance. The four-ply belts, which travel 300 fpm, are 330-ft long by 24-in. wide. They are expected to last several more years.

The belts are made with a special man-made rubber capable of resisting the effects of heat. According to B. F. Goodrich, the special rubber remains pliable and elastic even when exposed for long periods to the baking action of hot materials at temperatures up to 350°F.

Conveyor, Press Brake Speed Up Output

A conveyor system rigged to a hydraulic press brake speeds up production for a producer of aluminum window frames.

Cost Aluminum Co., Gardena, Calif., finds that by teaming conveyors and press brakes they can up output considerably. Here's the setup that gets the job done: Extrusions are conveyed to the press brake operator. He positions these in the brake in double rows.

WILLIAMS-WHITE HYDRAULIC BULLDOZERS

The photograph illustrates a WILLIAMS-WHITE Hydraulic Bulldozer bending angle sections into complete circles as an initial step in the production of blade circle assemblies for use on road scrapers. The completed ring with gear inserted is shown at right in photo.

This is another example of the versatility of WILLIAMS-WHITE Hydraulic Bulldozers, available in capacities from 50 through 500 tons. For full information regarding these or other machines built to your specifications, write us or one of our representatives.

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OHIO, Cincinnati: Columbus or Dayton: Seifreat-Elstad Mach'y Co.
Cleveland: A. L. Bechtel & Son
OREGON, Portland: Allied Northwest Mach. Tool Corp.
PENNSYLVANIA, Pittsburgh: Frank Ryman's Sons
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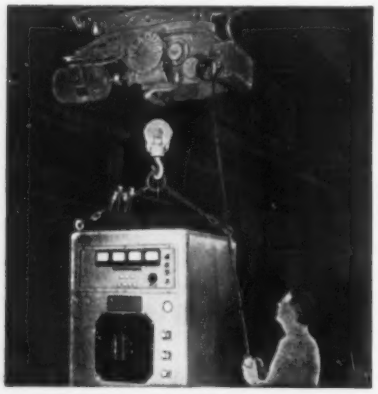

Push a button
for higher production with
READING ELECTRIC HOISTS

● Ohio Crankshaft's Tocco Division plant is meeting higher production goals with help from Reading Electric Hoists. The new plant was designed with a Reading Hoist "custom-built" into the plans. Write for our latest bulletin "The Why and How of Faster Production".

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The Operation—After positioning, the machine goes into action. Progressive dies simultaneously punch guide holes in the back row and cut pieces into four separate lengths in the front row.

The conveyor then carries completed frame sections to a welding operation.

Pacific Industrial Mfg. Co., Oakland, Calif., makes the hydraulic press brake.

Tape Insulates

A teflon film now available has very good thermal stability and the lowest coefficient of friction of any material. So states its maker, Permacel Tape Corp., New Brunswick, N. J. It functions efficiently from —200°F to 500°F. It resists practically all chemicals and solvents.

Gets Quality Welds Working One Side

Consumable weld inserts joining the ends of guided missile air tanks help Research Welding & Engineering Co., Compton, Calif., save weight and get x-ray quality welds of exceptionally high strength. The tank, 60 in. long by 30 in. diam, has to contain air under 3000 psi pressure and yet weigh less than 600 lb. Use of the inserts eliminates both the need for and the weight of back-up rings. In addition, they allow welding conveniently from one side only.

The weld insert, manufactured by Arcos Corp., Phila., is part of a process in which a ring of carbon steel, low alloy, or stainless steel with a specially designed cross section, is placed between the metal sections to be joined.

Uses Inert Gas Method—Inserts of 1722-AS material are used to make the root passes joining the ¼-in. thick heads to the 5/16-in. thick body of this SAE 4335 steel air tank. After proper joint preparation, the root pass is formed by fusing the insert with automatic inert gas shielded tungsten arc equipment. More frequently, the root pass welding is done manually with an inert gas shielded tungsten arc torch.

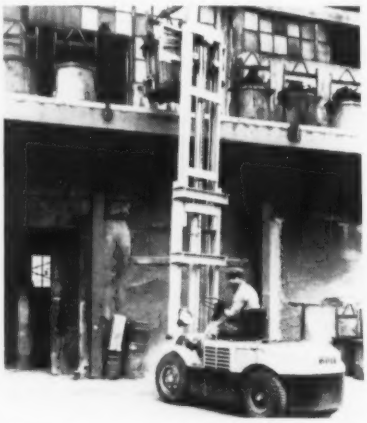
Following finishing of the root pass, the joint is completed by submerged arc welding. Heat treatment of the weld metal develops a tensile strength of over 200,000 psi to match that of the base metal.

In the recent past, this insert method of welding has proved especially effective in butt welding pipe for both conventional and nuclear power plants. It not only permits welding from one side only, but it is also said to produce sound, crevice free root passes with smooth inside contours.

Truck Charges Cupola

Due to yard restrictions, Washington Iron Works, Seattle, developed a unique and economical cupola charging system. This involves using of a Hyster 6000-lb lift truck equipped with a boom attachment.

Drop bottom charging buckets for coke and metal charges are loaded, weighed, numbered and



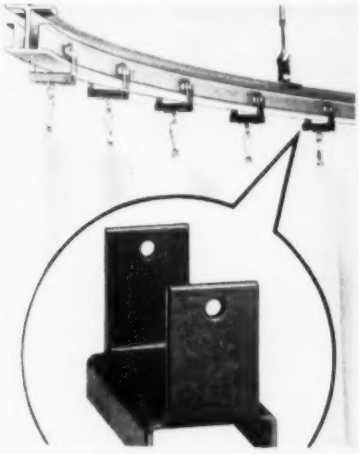
Its unique mast makes this truck handy around the cupola.

lifted to an outside overhanging platform at charging level. The buckets are weighed by means of a scale mounted to the uprights. A second truck on the overhanging platform carries the buckets to the cupola for charging.

Nylon On Metal Cuts Part Wear

Nylon is now being successfully applied to metals. A new coating process utilizing dry powders is reported to obtain engineering results previously unobtainable with nylon solutions.

Longer Part Life—Steel curtain carriers are now being nylon coated



These metal curtain carriers are coated with nylon.

by Lehigh Research and Development Corp., Allentown, Pa. by the new Whirlclad process licensed from Polymer Processes, Inc., Reading, Pa. The coating prevents metal to metal galling and scrape and provides longer life of parts. The low friction nylon surface reduces objectionable noise.

The Whirlclad process consists essentially of dipping a preheated object to be coated into a bed of finely divided dry coating powders, fluidized by rising currents of gas or air. The parts are preheated above the melting point of the coating powders, and the powder fuses onto the surface of the part. The object to be coated must have a higher melting point than the coating powders.

The process was invented in Germany by Knapsack-Griesheim under the term "whirlsintering." Patents have been issued in Ger-

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THE WHELAND COMPANY
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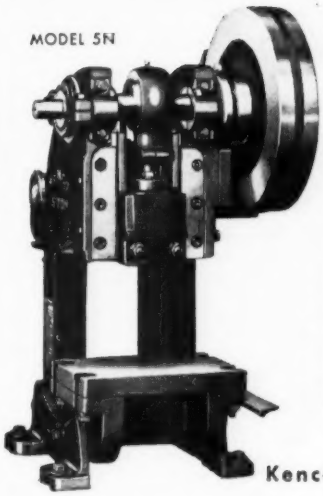
KENCO 5-TON
PRECISION-BUILT
PUNCH PRESSES

MODEL 5N



High speed punching . . . at low cost

These sturdy presses punch accurately and reliably at speeds up to 285 strokes per minute. Kenco-built for simple maintenance and long life, they save you time and manpower. Rugged, multiple-rib frame has tremendous strength . . . extra-long ram guides permit full use of the guiding area down to the bottom of the stroke for extra precision.

Six 5-ton models

provide low-cost solutions to many punching problems: Model 5 Standard (variable speed), Model 5-N Standard, Model 5-NR deep-throat (12¾" throat), Model 5-NA Universal 4-in-1 press, Model 5-A Universal Vari-speed, Model 5-R Vari-speed deep-throat.

Kenco presses—14 models—2 to 15 tons

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FLUID DRIVE
POWER STEERING

MODELS 1000 TO 25,000 LBS. CAP.

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
851 63rd Street, Brooklyn 20, N. Y.

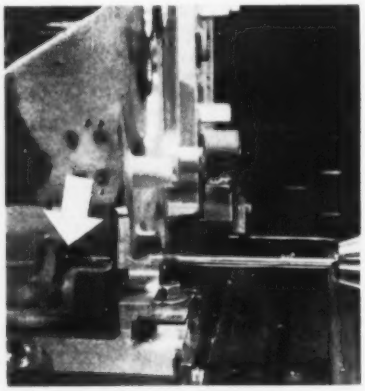
many, France, Italy and Great Britain, and are pending in the United States. Polymer Processes, Inc. has exclusive United States patent and licensing rights.

Using the coating material in dry powdered form results in a uniform coating unmarred by irregularity in material flow, or flow from sharp corners. A coating of 10 thousandths of an inch is obtained in a single dip.

Taps Remote Blind Hole with Ease

Tapping a remote blind hole on a gear train housing for a radar assembly can be a tedious and ticklish job. However, it's done with ease and accuracy, at Curran Machine Works, L. I. City, N. Y., by means of a "tap extension." This device is in constant use at the shop, specializing in unusual types of problem jobs.

Utilizing problem-solving tools, such as the tap extension, the shop



Here, a tool (arrow) taps a remote blind hole.

considerably reduces the amount of time and labor needed for jobs where hard-to-get-at tapping spots can slow down production and increase production costs.

Saves Time, Cash—"If we had to order special extension taps for each job," explains a shop spokesman, "we'd not only waste a lot

of time, but the costs would be greatly increased. The extensions eliminate the need for expensive pulley taps and also, they're designed so that dull or broken taps can be changed by hand without the use of wrenches, pliers or other hand tools."

Manufactured by Ritmar Corp., Huntington, L. I., the extensions are available in standard lengths of nine inches. For special applications, the manufacturer furnishes them, on order, in extra lengths up to 36 in., and with special shanks, adaptable to individual tapping equipment.

Bonds Rubber, Metal

Thanks to a new adhesive, a very strong bond between rubber and metal is possible. Using this adhesive, testers find a joint so strong that the rubber rips rather than peels from the metal. This works with both cured natural and synthetic rubber.

Cured in 24 hours at room temperature (77°F), the bond reaches maximum strength after seven days. It reaches maximum strength immediately after curing in four hours at 120 to 140°F. It's a development of Raybestos-Manhattan, Inc., Bridgeport, Conn.

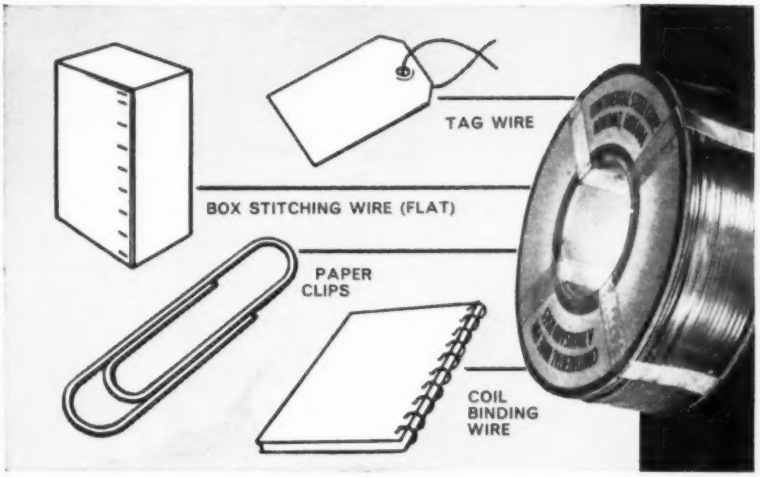
Thermostat Metal

Special properties are reported for a nonmagnetic thermostat metal. In test, magnetic forces up to 250 oersteds have failed to move this material. It is not influenced by, and doesn't cause disturbances in, magnetic fields.

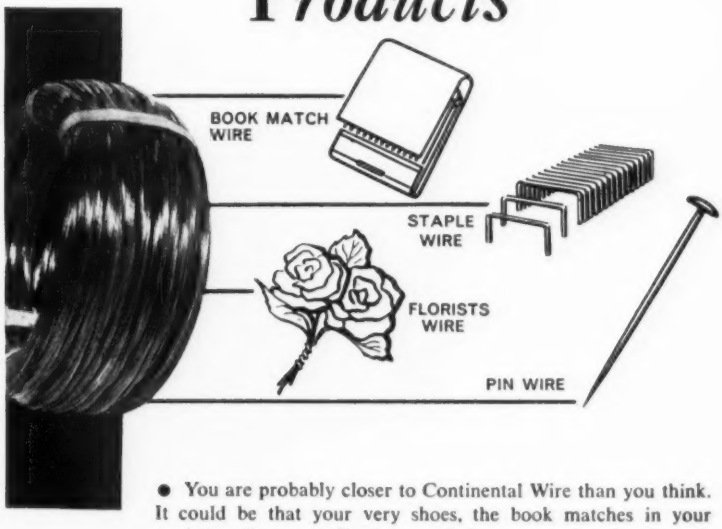
Though not generally available, General Plate Div., Metals & Controls Corp., Attleboro, Mass., is providing engineering samples to interested persons.

Giant Speeds Unloading

The "big scoop," one of the world's fastest barge unloaders, is now feeding the large coke and coal chemicals operation at U. S. Steel's Clairton Works on the



Fine and Specialty Wire for Super Fine Products



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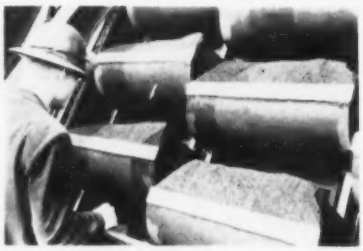
Monongahela River southeast of Pittsburgh.

Emptying a 900-ton river coal barge in less than half an hour, the coal-eating monster is push-button operated and replaces two clamshell bucket hoists to help keep the plant's 23 coke batteries (1,567 ovens), in operation. The mammoth continuous barge unloader was designed, fabricated and erected by Link-Belt Co. It features three endless lines of bathtub-size buckets, each of half-ton capacity.

Rotating Buckets—In operation, a boom over which the buckets travel, is lowered to a loaded barge. As the barge is pulled slowly between the river wall and the piers which support the unloading unit, the rotating buckets eat their way through the coal and strip it out in barge-width layers.

Two passes by the big scoop empty a barge and raise the coal for conveyance to the steel company's various operations where it is converted into metallurgical coke.



Each of these buckets lifts a half ton of coal.

coke oven gas and a variety of coal chemicals.

General contractor of the project was Roberts and Schaefer, now a wholly owned subsidiary of Thompson-Starrett Company, Inc., of Chicago.

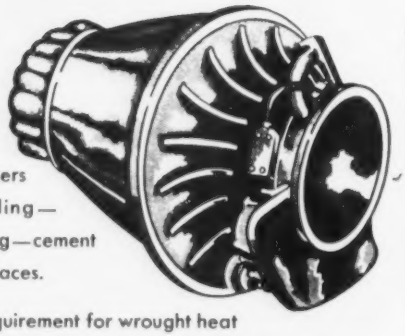
Adhesives Hold Metals At High Temperatures

Development of ceramic structural adhesives with the exceptional shear strength necessary for the bonding of metals at high temperatures is described in a report just released for industry use through the Office of Technical Services, U. S. Dept. of Commerce.

During the research, 24 ceramic adhesives of the ceramic-oxide, glassy bond type, including three commercially available porcelain enamel ceramic adhesives, underwent evaluation based on shear strength tests with standard stainless steel shear specimens and stainless steel honeycomb sandwiches. New techniques of specimen and adhesive preparation were devised.

Adhesives were found which yielded 1200 psi shear strength at room temperature; others 1100 psi at 600°F; 1500 psi at 800°F; 2300 psi at 900°F; and 800 psi at 1000°F. No single adhesive, however, possessed all of those strengths. Best performance was shown by porcelain enamel ceramic adhesives with thermal expansion approaching that of ingot iron.

WROUGHT HEAT RESISTANT ALLOYS
Vital for the Jet Age



Combustion chambers for jet engines—fixtures to braze honeycombs or heat treat gears—hangers for porcelain enameling—molds for glass forming—cement kilns or refinery furnaces.

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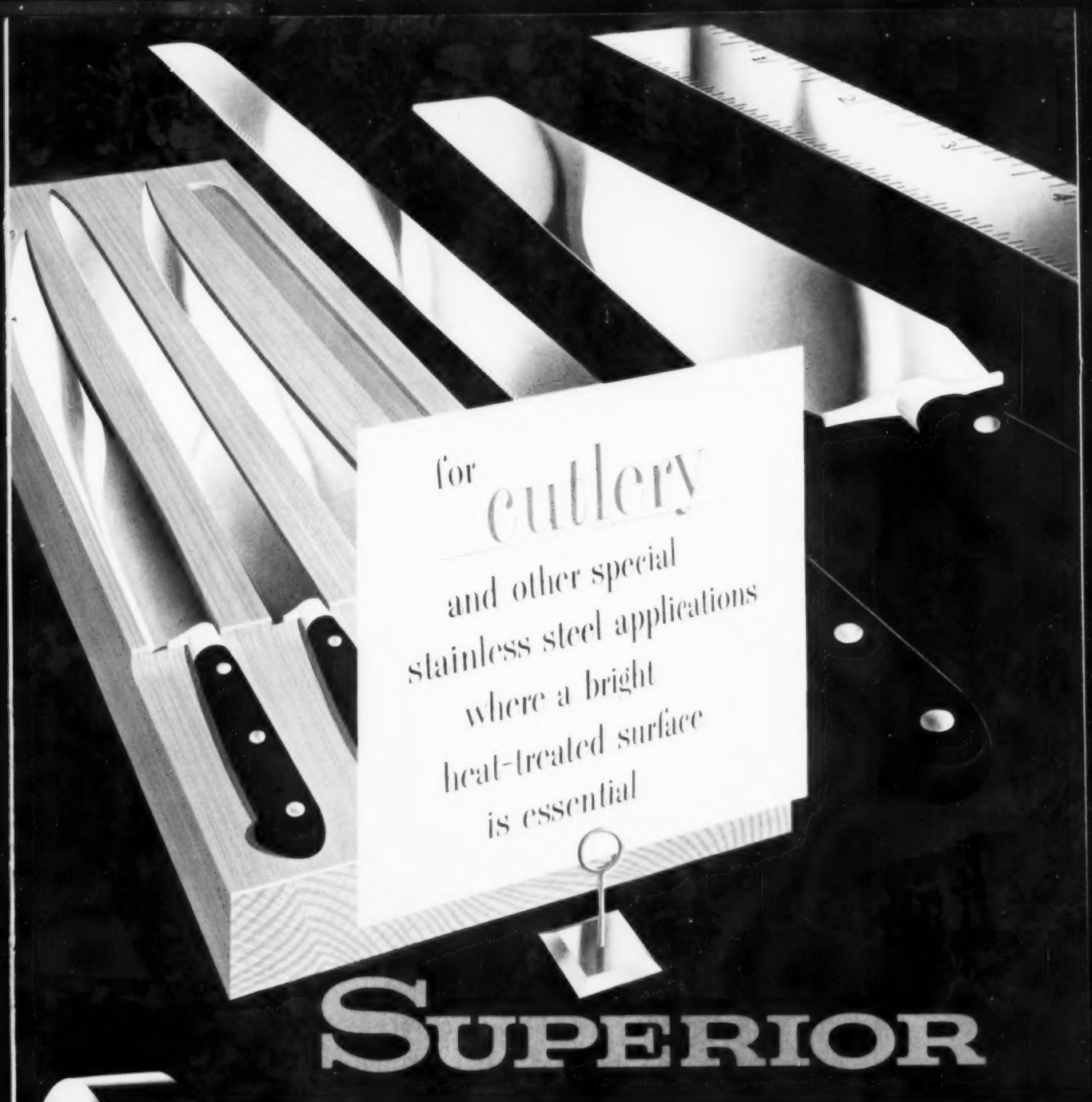

SUPERIOR

bright-annealed

or

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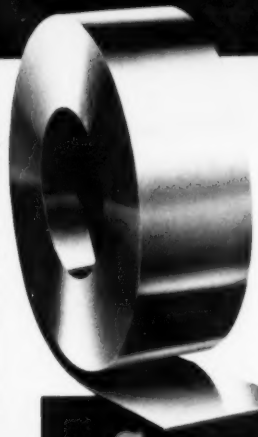

Made in our new, bright heat-treating furnace — in widths up to 20 inches, and in thicknesses from .015" to .065". Write for quotations on your requirements.

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CORPORATION
CARNEGIE PENNSYLVANIA

Maybe you're paying

for top quality "Commercial Grade" Roller Bearings...BUT ARE YOU GETTING THEM?

Cutaway view of Rollway Tru-Rol® segmented-retainer roller bearing ... one of three distinct types of Tru-Rol bearings available.

True, there's a wide difference in quality and cost between the low-range and high-range of any "commercial grade" bearing. But every Rollway Tru-Rol "commercial grade" bearing approximates as closely as possible maximum standards of construction consistent with the price.

Take the matter of separators, for example: In Rollway bearings, separators give maximum guidance to each roller. The result is greater total load capacity and longer life.

Equal spacing of rollers means uniform distribution of load. The result is the elimination of destructive "pulse" and vibration.

Moreover, separators are of deep section, formed to the curve of the rollers, giving true axial alignment, smooth-surface contact and an even lubrication film on each roller.

It's little things like these that mount up to big savings in service. Check the accompanying list, or ask a nearby Rollway Service Engineer to explain in detail the quality you should be getting in your "commercial grade" bearings. No cost. No obligation. Just write us. Rollway Bearing Co., Inc., 586 Seymour St., Syracuse, N. Y., *manufacturers of a complete line of radial and thrust cylindrical roller bearings.*

ENGINEERING OFFICES: SYRACUSE • BOSTON • CHICAGO • DETROIT • TORONTO • PITTSBURGH • CLEVELAND • MILWAUKEE • SEATTLE • HOUSTON • PHILADELPHIA • LOS ANGELES • SAN FRANCISCO

Check This List AND BE SURE!

Retainer Operation

☐ Is the retainer roller-supported, to reduce sliding friction?

Retainer Construction

☐ Is the retainer strong enough to withstand shock loads and sudden reversals?

(A Rollway segmented-type steel retainer, such as that illustrated, is the strongest, most durable available in commercial grade bearings.)

Roller Spacing

☐ Are all rollers equally separated, or do some rub against each other in opposed-motion friction?

☐ Are rollers distributed evenly to prevent "pulse" and vibration?

Roller Construction

☐ Are the rollers crowned for optimum load distribution?

For Top Quality in Every Detail Buy Tru-Rol and Be Sure!

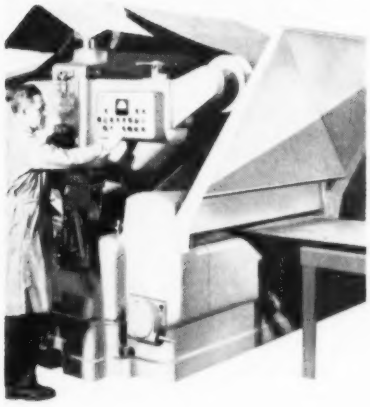
New Production Ideas

Equipment, Methods and Services

High-lift Industrial Fork Truck Has No Mast

There's absolutely no possibility that this fork lift truck's operator will have his vision obstructed by its mast. And there's one good reason for this—the materials handler has no mast. Despite this, the truck can lift heavy loads some 120 in. into the air. That's not all. The fork lift truck boasts lifting capacities from 12,000 to 20,000 lb. An electric motor provides motive and lifting power for the unit, which travels at normal speeds for such equipment. In addition to the advantage of giving the driver excellent visibility, the fork truck features another major asset. Its built-in retraction system can tilt or lift loads separately. It can also tilt and lift loads simultaneously. Known as the "Elbolift," the truck is said by its manufacturer to be the first of its type ever produced. (Automatic Transportation Co.)

For more data circle No. 40 on postcard, p. 145



Belt Grinder Fine-finishes Work in One Pass

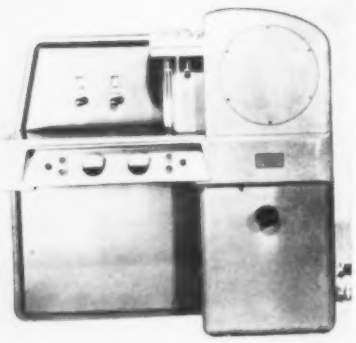
Capable of providing outstanding finishes to precise gage thicknesses in a single pass is this machine. It's a pinch roll belt grinder that'll work titanium, stainless steel, or carbon steel flat stock. Four machine sizes are available, providing capacities of 36, 48, 60 and 72 in. Feed roll speeds adjust from one to 100 fpm to meet a variety of operating requirements. The machine, says its maker, turns out such fine finishes that expensive, time-consuming hand-finishing operations are unnecessary. High operating efficiency and low belt costs are said to be assured by the belt drive and idling mechanism. These provide for belt travel over four rolls designed in a diamond shape. This arrangement, together with the 20-ft 3-in. belt, provides good flexing and chip removal. It also allows the belt to remain cool and free-cutting during long periods of operation. (Mattison Machine Works).

For more data circle No. 41 on postcard, p. 145

Teams Punch Press With Multiple Bender

Fully automated, this machine combines a horizontal punch press and a multiple bending unit. The hydraulically powered, high speed machine utilizes some unique press bending principles. It simultaneously pierces and countersinks holes, flattens, coin-welds projections, and produces multiple bends in two tubular parts. The rate for doing this is 1440 pieces per hour. In a typical operation, a worker loads one right-hand and one left-hand straight tubular part into the dies. Pressing two safety cycle buttons starts the unit. The hydraulic ram advances at high speed under low pressure. It simultaneously pierces and countersinks four holes, flattens an area, and coins two weld projections in each part under high pressure. Then, it clamps the parts, bends them around die forms to produce three bends in each part. (Walter P. Hill, Inc.)

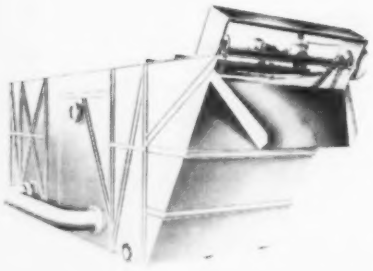
For more data circle No. 42 on postcard, p. 145



Spectrograph's Range Includes 81 Elements

Recent design additions to one firm's multi-indexing X-ray spectrograph have extended the instrument's range to include 81 elements in the atomic scale (from magnesium to uranium. The new spectrograph provides an accurate and rapid analysis of products in any critical stage of manufacture; it also indicates the need for addition or removal of elements to guarantee uniformity of mixes, batches or degree of purity of components. Developed to save time and effort for the lab man, the unit is a tool for maintaining precise quality control of incoming raw materials, processes and finished products. The instrument comes in two units: a main chassis and a programming console. (Philips Electronics, Inc.)

For more data circle No. 43 on postcard, p. 145



Setup Offers High Rate, Micronic Filtration

With a 1000-gpm flow rate capacity, this tubular screen vacuum unit filters grinding coolants and cutting oils. Especially designed for this purpose, the filter makes microinch finishes more easily attainable. Filtration is accomplished by tubular screen elements manifolded into a suction header box in which a 150-psi vacuum is maintained. The unit cleans itself. It does this via a float activated micro-switch which energizes an air valve and cylinder. It reverses the coolant flow through a four-way valve. Coolant keeps flowing during cleaning. (Industrial Filtration Co.)

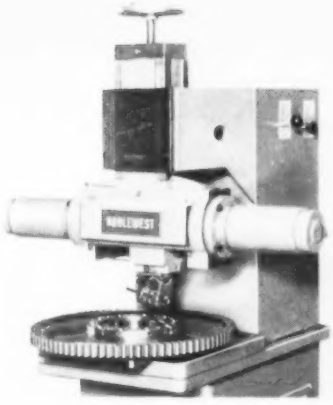
For more data circle No. 44 on postcard, p. 145

PAINT FLAKES
AND HEADACHES
Mike's been screaming about the paint flaking off these dashboard panels. Seems the iron phosphate coating isn't holding tight.
Better cleaning makes Pennsalt Fosbond a better phosphate coating. You know, the early preparation of the metal makes the difference, and nobody knows more than Pennsalt in that field.
Well, let's see what the humidity and salt-spray tests show.

Rotary Machine Quickly Marks Engine Parts

Speed is a key feature of this roll making machine. It marks parts at a rapid pace. Comparable to an air or hydraulic press with characteristic vertical ram travel, the machine makes use of this to provide the marking pressure. Air pressure, preset at a regulator, controls the depth of the mark. In addition, the unit has an air operated die slide which accommodates the roll marking tools. This slide travels laterally to perform the roll marking operation. It works like this: Parts are placed on the work table; the operator then depresses a foot control, initiating the machine cycle. A pressure ram descends and applies marking pressure. Following this, the die slide travels from right to left to roll in the mark. The ram then retracts; the die slide returns. A dual control permits the ram and die slide to work independently. (Noble & Westbrook Mfg. Co.)

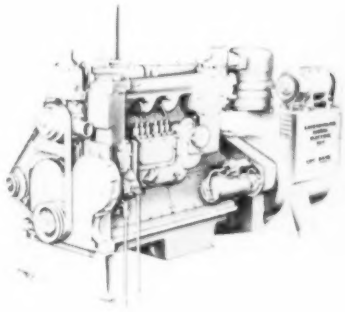
For more data circle No. 45 on postcard, p. 145

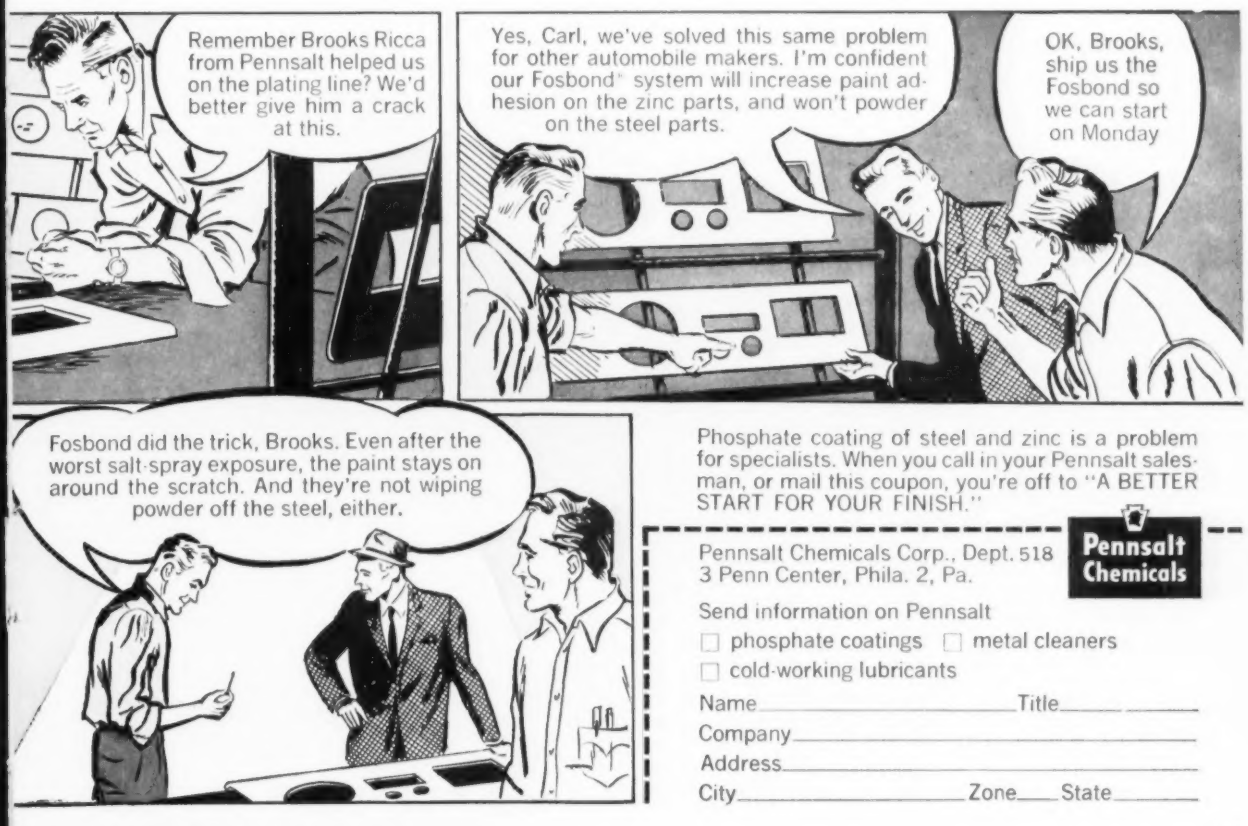


Electric Sets Are Compact, Durable Generators

Compact and willing to take rough handling is this engine. It's now available as the power unit for both turbocharged and naturally aspirated electric sets. Advantages of such electric sets are: space saving and efficient self-regulating constant voltage generation features. The turbo-charged electric set arrangement rates at 75- kw; the naturally aspirated one rates at 60 kw. Contributing to the reduced dimensions of the units is the generator's design. This features a top-mounted exciter and a single, heavy duty bearing. A flex-plate coupling joining the generator to the engine flywheel eliminates any front bearing. (Caterpillar Tractor Co.)

For more data circle No. 46 on postcard, p. 145




Remember Brooks Ricca from Pennsalt helped us on the plating line? We'd better give him a crack at this.
Yes, Carl, we've solved this same problem for other automobile makers. I'm confident our Fosbond* system will increase paint adhesion on the zinc parts, and won't powder on the steel parts.
OK, Brooks, ship us the Fosbond so we can start on Monday
Fosbond did the trick, Brooks. Even after the worst salt-spray exposure, the paint stays on around the scratch. And they're not wiping powder off the steel, either.

Phosphate coating of steel and zinc is a problem for specialists. When you call in your Pennsalt salesman, or mail this coupon, you're off to "A BETTER START FOR YOUR FINISH."

Pennsalt Chemicals

Pennsalt Chemicals Corp., Dept. 518
3 Penn Center, Phila. 2, Pa.

Send information on Pennsalt

☐ phosphate coatings ☐ metal cleaners
☐ cold-working lubricants

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Gas Generator

A high-efficiency source of inert gas is available in a new generator, according to the manufacturer. The unit can use untreated river water because there is direct contact between the products of combustion and cooling water. It can burn standard gas or distillate fuel oil; except for burner and controls, the system is basically the same for either fuel. And, except for a small integral chamber, there is no refractory. (Thermal Research & Engineering Corp.)

For more data circle No. 47 on postcard, p. 145

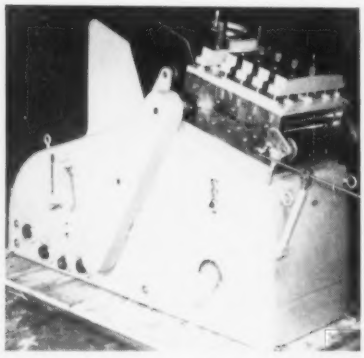
Band Saw Blade

High speed steel saw bands now available retain hardness up to 1100°F. This means very high speeds and feeds are possible, cutting hard or tough materials. Thicknesses of these new bands range from 0.025 to 0.042 in., comparatively thin indeed. The manufacturer recommends the bands for cutting tool and die steels, all ferrous alloys including carbon steels, free machining steels, alloy steels, tool steels, stainless, titanium and other hard-to-cut materials. (The L. S. Starrett Co.)

For more data circle No. 48 on postcard, p. 145

Cradle, Straightener

This combination coil cradle and power-driven straightener handles materials to 16-in. wide. It takes up to 48-in. OD coils. The cradle employs four power-driven rest rolls, one idler rest roll and one bumper roll. The straightener has eight hardened and ground straightening rolls (lower four are power driven), indicators on the upper rolls, and two hardened and ground power-driven take-in rolls. A 3-hp vari-speed drive motor provides output speeds from 26 to 76-fpm. It operates on 220/440-v, 3-phase, 60-cycle alternating current. (U. S. Tool Co., Inc.)



For more data circle No. 49 on postcard, p. 145

Scarfing Torch

Independent control of both preheating and scarfing oxygen flows is provided by this three-hose scarfing torch. It solves a classic problem in heavy work where large metal removal rates are necessary. This is done, too, without complicated valving and regulating devices within the torch itself. This means torch maintenance is down. Scarfing oxygen pressure in any torch is generally 5 to 7 times the pressure of

ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Sharp eyes, made sharper by scientific instruments, verify microscopic details of thread accuracy at Erie Bolt & Nut Company. This is but one proof of the painstaking craftsmanship your own fastener specifications receive from the hands of Erie specialists. Fasteners to resist corrosion, extremes in temperature and tensile stresses to your specifications have been our exclusive job for almost half a century.
Send us your specifications for prompt estimate.

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ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives In Principal Cities

Speaking of Records

. . . *our* records show that when a manufacturer once discovers the exceptional and uniform quality of Roebling flat spring steel, he becomes a permanent Roebling customer.

Your records for faster production and lower costs can be improved, in large measure, by Roebling's strict attention to supplying you with the finest flat spring steel available. When you need flat spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

These are typical of the many types of quality parts produced from Roebling flat spring steel.

ROEBLING

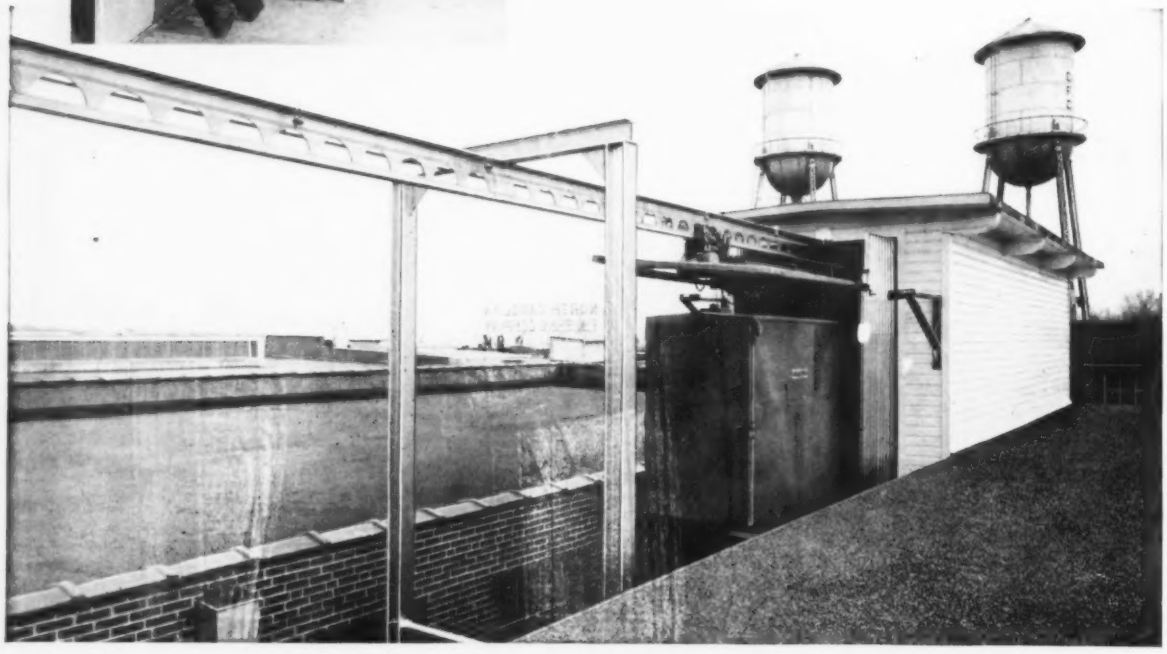
Branch Offices in Principal Cities • Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Uses Skyway For Handling Materials AUTOMATICALLY

Completely Pays for Itself Every Three Years

Loading a van on the second floor of a building. This same van also may be lowered to the floor below for loading. Although the building at this end of the system is quite old, the Cleveland Tramrail equipment was easily installed. For years this vast roof area did nothing more than provide protection from the weather. Now it is being used profitably for materials handling. Illustrated is the van emerging from the penthouse.



BY erecting a Cleveland Tramrail materials handling system over the roofs of its buildings, a large plant is able to transport materials between departments located in widely separated buildings at very low cost.

Because the system operates automatically, the Tramrail carrier travels back and forth without any operator. The carrier van is loaded or unloaded at convenient areas inside the buildings. Pressing a button sends it on its way. It rises vertically to a penthouse on the roof. Then it makes its run over the track system to the penthouse at the other end. Here it lowers to the floor inside for loading or unloading.

The system eliminates considerable floor traffic and saves space required for wide aisleways. It operates at any time, day or night. Inclement weather does not hinder it. The system requires only a fraction of the maintenance necessary for floor handling equipment. It does not wear or damage floors. It is a big aid to safety. In addition to these important benefits, the Cleveland Tramrail system makes tremendous time savings — enough to completely pay for the entire installation every three years.

Cleveland Tramrail has had wide experience in automatic dispatch materials handling systems of many types. Our engineers will welcome an opportunity to work with you.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4819 E. 290th St. • WICKLIFFE, OHIO

the preheat oxygen. With this in mind, metal removers find that keeping stability of the flow of oxygen-for-combustion irrespective of oxygen-for-scarfing is very important. The three-hose scarfing torch employs independent pressure regulators which control the flows. The torch has a maximum 6000-cfh scarfing oxygen capacity at a station regular pressure of 100 psi when used with 50 ft of ½-in. hose. Other capacity models are available. (National Cylinder Gas Co.)

For more data circle No. 50 on postcard, p. 145

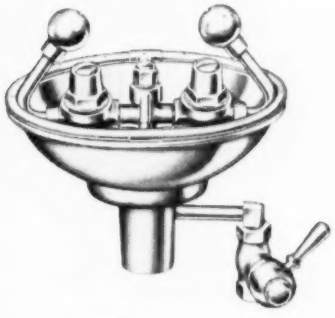
Heavy-oil Burner

New burners from one manufacturer are designed especially for heavy residual fuels. Combustion is 80 pct complete within the burner, with all combustion air furnished through the burner. Excess air for tempering can be introduced without causing smoke or instability. Burner units are available as complete assemblies in sizes from 3.5 to 18-million btu per hr. (Thermal Research & Engineering Corp.)

For more data circle No. 51 on postcard, p. 145

Emergency Fountain

A new emergency fountain instantly washes eyes and face. It's meant to give instant relief to workers contaminated with dangerous chemicals or other injurious matter.



Two controlled streams of water project from specially designed fountain heads to flush matter from the eyes; numerous jets of water spurt from the circular face-wash ring. In this manner, dangerous materials can be thoroughly washed away, possibly avoiding permanent damage. (Haws Drinking Fountain Co.)

For more data circle No. 52 on postcard, p. 145

Push-button Switches

Tiny in size, a new illuminated push-button switch comes in five colors for three voltages. Projecting less than an inch behind any panel, it has a maximum diameter of 5/8 in. Up to 225 of them mount in a square foot. Designed primarily for electronic pulsing setups, the miniature push-buttons adapt to many jobs. (Alden Products Co.)

For more data circle No. 53 on postcard, p. 145

Mercury Lamps

Four new 1000-w mercury lamps provide nearly 5 pct more light than previous lamps of this type. Application of a special phosphor as an internal coating to four models of 1000-w bulged tubular shaped lamps make this possible. (General Electric Co.)

For more data circle No. 54 on postcard, p. 145

Charlie says – "Come as you are!"

They have everything we need in WESTern PENNsylvania

- *100% Financing* of industrial plant space through Community-State Program
- *2% Minimum Interest* on half your plant cost for 25 years (max. terms)
- *Major steel sources* "next door"

Plus: "Midway Location" to major markets and raw materials; excellent transportation — by rail, water, highway, air; experienced "home-town" labor; leading research facilities nearby.

Charles M. Fife, Mgr., Area Development Dept. *IA-3*
West Penn Power Company
Cabin Hill, Greensburg, Pa.

CONFIDENTIAL REQUEST: I am interested in the 100% Financing Plan and low interest rates available in WESTern PENNsylvania. Please have your representative contact me.

Name _____ Title _____

Company _____

Address _____

City and State _____

WEST PENN POWER
an operating unit of the WEST PENN ELECTRIC SYSTEM

Infrared Telescope

This instrument is expected to find numerous applications in research, experimentation, etc. It could be used for industrial plant security; for microscope studies under infrared and ultra-violet light; spectroscopy; infrared photography; location of fires in smoke-screened fires. With it, the user can see in the dark without being observed. The image tube is the essential element. Contains a semi-transparent photocathode which is processed to be sensitive to infrared radiation. It also contains an electron lens for imaging electrons from the photocathode on to a fluorescent screen which becomes luminous upon bombardment by electrons. When an infrared image is focused on the photocathode a visible reproduction of this image

is formed on the fluorescent screen (Edmund Scientific Co.)

For more data circle No. 55 on postcard, p. 145

HE'S MINING THE HOTTEST RUBBER IN THE WORLD!

In its final stage . . . this rubber will be called SILICONE. If you have a rubber part problem involving extremely high temperatures, SILICONE can be your answer.

Stalwart engineers are prepared to produce standard or special SILICONE compounds in virtually any shape to meet your requirements. Extruded, molded or die-cut and machine-cut shapes can be delivered in any production quantity.

While we think of rubber as generally coming from trees, today's synthetics are coming from many diversified directions. In this case . . . it's rubber from rock.

STALWART RUBBER COMPANY
164 Northfield Road • Bedford, Ohio

Manufacturing Plants in Bedford, Ohio and Jasper, Georgia
164 Northfield Rd.
Bedford, Ohio

Self-Lube Bearings

Self-lubricating bearings of a new type employ composite structures consisting of two fused layers. The bearing face is a weave of Teflon fibers. These are interwoven on the back with glass fibers. The back-up

layer is a weave of glass fibers impregnated with thermo-setting phenolic. These two layers are bonded and cured at elevated temperatures and pressures. This results in a dense lattice of Teflon fibers facing the bearing surfacing and intimately supported by inter-linked glass-phenolic structure. (The Micromatic Hone Corp.)

For more data circle No. 56 on postcard, p. 145

Thin-wall Tube

Thin-wall "spaghetti" tubing is now available in thicknesses from 0.005 to 0.010-in. AWG sizes No. 30 through zero. Yet its maker reports that it has the strength and properties of heavier-wall types. Of

Teflon, the tubing operates in a wide temperature range (—450 to +550°F). Its major advantage is the weight factor; this means less storage space, easier handling. (W. S. Shamban & Co.)

For more data circle No. 57 on postcard, p. 145

Diamond Wheels

A West Coast manufacturer reports it's using a new method for dressing bonded, metal diamond wheels. This involves using rubberized abrasive blocks. Resulting cushioned action is said to permit the block to "flow" around and between diamond particles to clean away smear metal and clogging. These are usually difficult to remove. (Cratex Mfg. Co.)

For more data circle No. 58 on postcard, p. 145

Metal Nibbler

Looking for a tool that'll cut holes in tubes and ducts where the original contour must be maintained? Or maybe you just want to cut 14-gage steel quickly, without distortion. If so, a nibbler may be the tool you're looking for. It's a combination hand-bench unit that bites away at 14-gage stainless, nickeled, CR steel and galvanized iron. (Fenway Machine Co., Inc.)

For more data circle No. 59 on postcard, p. 145

Multi-Job Truck

This four-wheel selector truck can lead three lives. It'll fit into either tractor-trailer systems, in-floor dragline or manual operations. It adapts to virtually any warehousing and/or order picking function. Possessing a 2000- to 2500-lb capacity, the truck employs 8-in. casters and either 10- or 12-in. main wheels. Decks of the trucks are constructed of all-steel hardwood. Rounded corner pads are located at the rear of the deck, with a heavy-duty rounded corner bumper at the front; this protects the dragline mechanism and pushing handle. Nine different deck sizes are available. These range from 30 x 48 to 36 x 60 in. (Lewis-Shepard Products, Inc.)

For more data circle No. 60 on postcard, p. 145

Oxygen Indicator

Some 20 times more sensitive than older models, a new oxygen indicator measures minute traces of molecular oxygen in a wide range of gases. These include hydrogen, nitrogen, ethylene, other hydrocarbons either saturated or unsaturated, helium, argon and other inert gases. It has two ranges: 0 to 10 and 0 to 100 parts per million. (Baker & Co., Inc.)

For more data circle No. 61 on postcard, p. 145

WISSCO

Perforated Metals

. . . for standard or special applications
. . . from stock or custom-made

Virtually any material obtainable in roll, strip, sheet or plate form can be perforated economically into rounds, squares, slots or decorative grille patterns on Wissco's modern equipment. Our dies cover a wide range of perforation sizes.

Slot perforations, for example, are available in end-staggered or side-staggered arrangements in the following size ranges:

	SLOT DIMENSIONS	ROW SPACING
End-staggered (min.)	3/32" x 1/2"	3/32"
End-staggered (max.)	1" x 2"	3/8"
Side-staggered (min.)	.050" x 1/2"	1/8"
Side-staggered (max.)	3 1/4" x 6"	1/4"

Many popular styles are available from stock, or we will perforate to your specifications. For complete information contact the sales office nearest you.

In the East:
WICKWIRE SPENCER STEEL DIVISION — Atlanta · Boston Buffalo · Chicago · Detroit · New Orleans · New York Philadelphia

In the West:
THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland

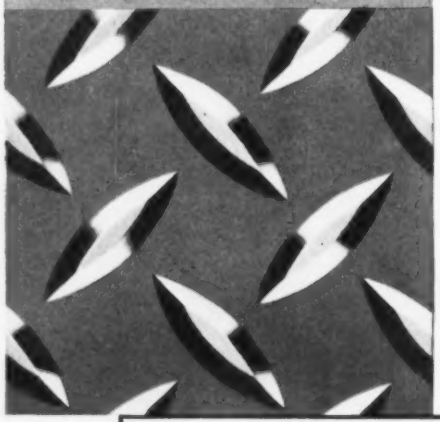
5433

WISSCO
CF&I
PERFORATED METALS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

WORLD'S LARGEST LADLE CRANE HAS EXTRA SAFETY

WHERE SAFETY COUNTS

Designed for maximum performance, the world's largest ladle crane built by Morgan Engineering Co. can handle . . . in one trip . . . a ladle containing 375 net tons of molten steel. That's efficiency *plus* . . . to which Alan Wood's Super-Diamond floor plate has added *safety!* More than 1,270 sq. ft. of footwalk area on the crane is built of A.W.SUPER-DIAMOND rolled steel floor plate. SUPER-DIAMOND'S anti-slip protection comes from raised diamond-shaped figures . . . alternately spaced at right angles and correct distances. These raised figures give safe foot-gripping from any angle of approach.



Wherever oil, grease or other substances raise special slipping accident hazards, we suggest a check on the special non-slip qualities of A.W. ALGRIP—the world's only abrasive rolled steel safety floor plate.

A.W. SUPER-DIAMOND
ROLLED STEEL FLOOR PLATE

ALAN WOOD STEEL COMPANY • CONSHOHOCKEN, PA.

The Iron Age Summary

1957 Could Be Second-Best Year

Gloomy talk to the contrary, steel output this year will approach 1955 record.

Mills say business is up, but some are disappointed over the slow start.

■ Despite the gloomy talk going the rounds, this could be the second-best production year in steel's history.

There's a good chance that more than 116 million ingot tons of steel will be made this year. This would be better than last year's 115 million tons, and would approach 1955's record 117 million tons.

Fanning the Flames—Meanwhile, steel men are busy this week fanning the flames of the Fall pickup in their market. The fire is small as yet. And some mills profess disappointment over the slow start. But there is a chance the upsurge will approach bonfire proportions before the month is out.

A lot depends on automotive. Detroit buyers have been making tentative passes at the market, and heavy tonnages have not materialized as yet. Still, there are signs that the vital sheet and strip market could break upward in a hurry.

Deliveries Lengthen — Without much help from automotive, sheet and strip delivery promises are lengthening in Chicago. Two weeks ago, Chicago mills were offering to deliver cold-rolled carbon sheet and strip in three to five weeks. This week, the best they can do is four to six weeks on strip; seven to eight weeks on sheets.

For the most part, the auto people are holding off on their commitments. Apparently they want to go easy until they get an inkling on demand for new models. But next year's labor negotiations in automotive are bound to have an effect on Detroit's thinking. For this reason the automakers are expected to lay in steel later this year and early next year as a hedge against possible labor trouble.

Pickup Reported—Mills generally concede that business has picked up the last several weeks. Some companies find business for September about 10 pct ahead of August. And a better ratio is expected for October. Yet a few outfits are becoming edgy. They had expected a better market situation to have developed by this time. The casual attitude of Detroit and some other users has them worried.

But these pessimistic views on the outlook may be overdrawn. A check this week shows that some firms are booking at a higher rate than they are shipping; the first trend of this kind in steel in many weeks.

Steel scrap prices slipped again this week in most major markets. The IRON AGE Composite price dropped to $48.50 on the basis of price drops in Philadelphia and Pittsburgh. Chicago held steady for the moment.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,125	2,074	2,074	2,462
Ingot Index				
(1947-1949=100)	132.3	129.1	129.1	153.3
Operating Rates				
Chicago	82.0	82.0	83.0	103.0
Pittsburgh	83.0	80.0*	81.0	98.0
Philadelphia	89.0	92.0	93.0	102.0
Valley	73.5	74.0*	72.0	99.0
West	101.0	97.0*	102.0	102.5
Buffalo	100.0	100.0	95.0	108.0
Cleveland	81.0	81.0*	90.0	110.0
Detroit	94.0	91.0*	50.0	104.0
S. Ohio River	90.0	86.0	83.0	90.0
South	83.0	85.0	85.0	96.0
Upper Ohio R.	95.0	92.0*	94.0	101.0
St. Louis	86.5	73.0*	84.5	96.0
Northeast	37.0	37.0	37.0	100.0
Aggregate	83.0	81.0	81.0	100.0

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.622
Pig Iron (Gross ton)	$66.42	$66.42	$66.40	$63.04
Scrap, No. 1 hvy (Gross ton)	$48.50	$50.17	$53.50	$58.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	28.50	28.50	40.00
Lead, St. Louis	13.80	13.80	13.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin Straits, N. Y.	93.00	93.00*	94.375	101.25
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

*Revised

Rubber Opens up New Outlets

With new and improved products coming from the manufacturers, industrial rubber is expanding its usefulness.

In today's market standard conveyor belting and hose are available for fast delivery.

■ While rubber conveyor belts and hoses continually pop up in new jobs, it is felt we are just entering the threshold of an expanded era in industrial rubber products.

Biggest tonnage items currently are belting for conveyors and V-belt drives and hose. Distribution, prices and types of most industrial rubber products, like other mill supply items, have wisely been standardized by the rubber industry. Delivery on most standard items is off-the-shelf from local warehouses in major centers. Special construction types require about 3-4 weeks delivery and when special materials are needed, about 10 to 12 weeks. Around 60 pct of the tonnage is special. On V-belts almost all sales are made from stock.

Prices Are Up—Industry prices were increased an average of 3 pct across the board Aug. 1 after a new labor contract settlement by one large producer with others following suit.

However price shading continues to be an industry headache.

For the metalworking and producing industry, companies like B. F. Goodrich of Akron, O., have dozens of new items going—many of them conversions from other methods often with significant improvements.

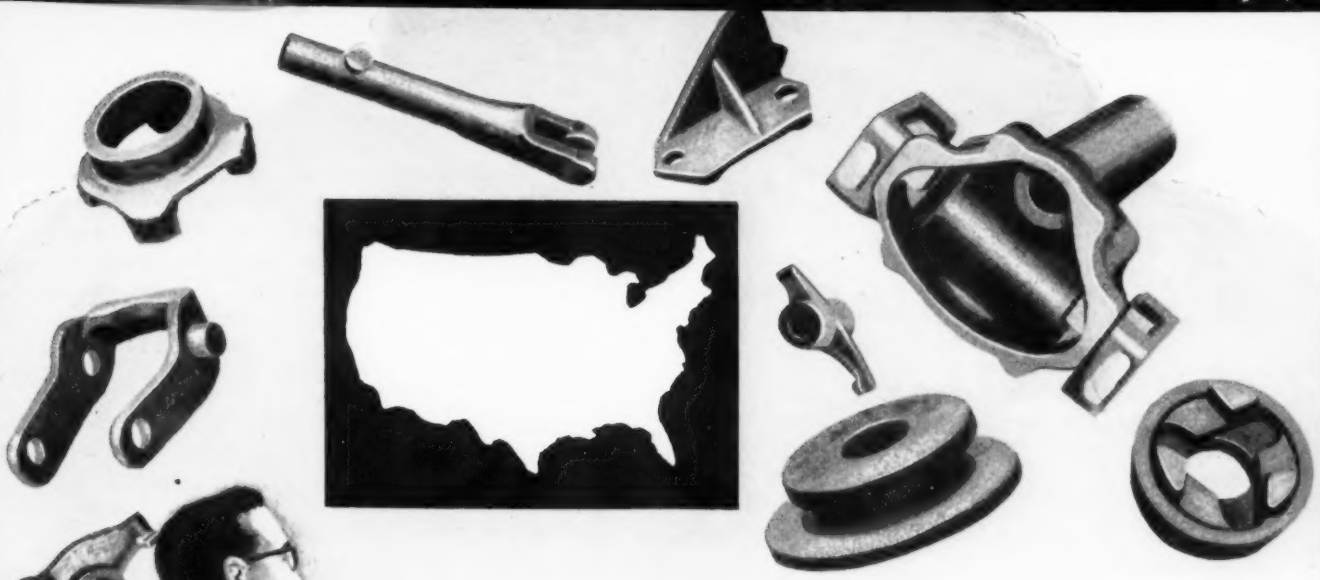
Beats the Heat—A traditional foundry problem has been hot risers and sprues from castings missing cooling and burning holes in the conveyor belts used to haul them away. Often a layer of sand is put down to protect the belt. After a hole is burned, sand pours through and is dropped all along the belt length. Belts must also be stopped and spliced. Goodrich introduced a type with bias-laid glass fabric ply which will withstand heat to 700°F.

Reduces Scatter—Another new gimmick is the turn-over belt. When conveyor belts carry wet or corrosive material, some of it sticks to the belt on the return trip. This fouls up idler rolls and scatters loose material on the floor. And on winter morning start-up, a damp outdoor belt will be frozen to the pulleys. The new turnover has rolls which turn the belt right side up immediately after discharging the material. Thus it cuts scatter of the material, saves pulleys and doesn't freeze to them.

Licks Icing—Another innovation on the way is a real stickler in more ways than one. In the Mesabi Range and other cold region iron mines, conveyor belts are shut down at night. And the moisture freezes them solid to pulleys all along the line. In the morning they must frequently be chopped loose by hand or broken loose by drive motors under severe overload. Goodrich plans to install a new belt with imbedded wires and an induction heating coil to melt the ice or evaporate the moisture before shutdown.

Hose Markets—The other major industrial rubber product—the hydraulic hose—is finding its biggest industrial market in mining equipment, earthmoving machinery and aircraft.

DISTINGUISHED SERVICE: Quality products, like conveyor belt in use for 10 years without repair and with little maintenance, are aim of industrial rubber equipment makers. (B. F. Goodrich Co. photo.)



PUZZLED OVER SOURCES

FOR *malleable, pearlitic malleable, carbon steel, alloy steel*

CASTINGS?

Then National is your answer. We play no favorites, have no prejudices —for we cast all these metals.

From our six strategically located foundries, we can supply castings in HTM (Hi-Tensile Malleable), standard malleable, carbon or alloy steel. That means you get all the "multiple source" advantages . . . yet you deal with *one* company having unparalleled facilities in *many* plants. Remember, it's just a *part* of the National story—flexibility of production with individual attention.

AA-4674

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

Established 1868 • Cleveland 6, Ohio

The nation's largest independent producer of malleable and pearlitic malleable

STEEL PRODUCT MARKETS

Tin Mill Pricing Policy Changed

U.S. Steel scraps method of announcing revisions once or twice a year.

New practice will list changes at least 35 days before their effective date.

■ An era in the pricing of tin mill products is nearing an end.

The previous industry practice of announcing new prices on an annual or semi-annual basis is being discarded. U. S. Steel Corp., for example, has indicated that, effective January 1, it will discontinue that practice. Thereafter revisions in mill bases, extras and deductions on tin mill products will be announced not less than 35 days prior to effective date of the changes. Buyers will continue to pay the prices in effect at the time of shipment.

Flexibility Wanted—The Corporation's current base prices, extras and deductions on electrolytic and hot dipped tin plate, black plate, and terne plate will hold through December 31.

The trend away from long-term pricing of tin mill products reflects, in part, the need of producers for more flexibility to meet changing costs. Current labor contracts granting periodic cost-of-living adjustments during the year indicate the importance of getting this flexibility.

Previous opposition from the canmakers to shorter-term pricing has faded to a degree. It used to be felt that price changes within a crop season penalized a canner whose crop came in late. Today, with one in five cans being used for beverages, that seasonal factor is less important.

Sheet and Strip—Increased buying continues, but volume is still not large and orders are slow coming in. Demand is expected to hit peak in November as auto steel buyers move into high gear. Mills in many areas are still making up open time by rolling light plate. **Detroit** mills, while not displeased with September ordering, call it "spotty." Some **Eastern** mills feel October will easily better September but don't yet have orders to prove it. More activity at **Chicago** has lengthened cold-rolled sheet deliveries to 7-8 weeks, cold-rolled strip to 4-6 weeks.

Plate and Structurals—Both are still usually quota items, although the supply picture could improve after the first of the year. Mills and warehouses in **Chicago** had to turn down recent customer inquiries on heavy plate. Railroad car builders are buying light plate fairly heavily for fourth quarter delivery. There are structurals carryovers of up to 8 weeks in the **Midwest.** A big **Eastern** producer of wide flange beams is about 2 months behind in deliveries. However, the **West,** long short on plate and structurals, now reports heavy plate easier to get and so are wide flange beams.

PURCHASING AGENT'S CHECKLIST

Cutting costs through tight inventory control. **P. 83**

Armco has developed a new stainless steel, PH 15-7 Mo. **P. 88**

Makers of industrial diamond tools are just about able to keep up with orders. **P. 92**

Stainless—Market is a little improved, but still sluggish. Stainless wire and strip are receiving a mild pickup due to orders from auto makers and their suppliers. Strip is used for auto trim and wire goes into a variety of products. However, deliveries are still at a 2-3 week level and standard items can be shipped in a week if the customer insists.

Wire Products—Most wire products are available on very short delivery but upsurge is reported in orders placed by furniture and auto seating makers. Merchant wire products continue to lose ground against a rising tide of lower priced imports. Wire for farm fences is also slow.

Pipe and Tubing—Buttweld pipe can usually be obtained in a week, even within a few days in some cases. A **Midwest** producer indicates electric weld pipe in 6 to 8 in. sizes is in plentiful supply, product in the 10 to 12 in. range is a little harder to get, and in larger sizes, 14 to 20 in., it's tight.

Fasteners—Large **Midwest** producer reports orders are running 15 pct behind last year's pace as contrasted with only a 2 pct lag in the first half of the year. However, total dollar sales for the year are expected to pass last year's all-time record by the company. Deliveries are 2-3 weeks as against a 3-5 week level at the same time last year.

Pig Iron — Demand continues only fair. Most **Eastern** foundries are still on five day work weeks, but backlogs of orders have disappeared. Foundry inventories of pig iron are usually about a 30-day level with no effort being made to build them up.

Iron Ore—Lake Superior district shipments are 15.9 million tons ahead of a year ago, according to the American Iron Ore Assn., Cleveland. Cumulative total for the year up to September 2 was 58.2 million tons.

COMPARISON OF PRICES

(Effective Sept. 10, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Sept. 10 1957	Sept. 3 1957	Aug. 13 1957	Sept. 11 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	47.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	40.75
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.075
Light rails	6.50	6.50	6.50	6.00
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging, billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rod and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.622¢

	Sept. 10 1957	Sept. 3 1957	Aug. 13 1957	Sept. 11 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	70.51	$70.51	$70.38	$67.76
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	70.67	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	69.88	66.84
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, cents per lb‡ (74 to 76 pct Mn base.)	12.75¢	12.75¢	12.75¢	10.75¢
Pig Iron Composite: (per gross ton)				
Pig iron	$66.42	$66.42	$66.40	$63.04
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$50.50*	$52.50	$55.50	$58.50
No. 1 steel, Phila. area	*$7.50*	50.50	51.50	58.50
No. 1 steel, Chicago	47.50	47.50	53.50	59.50
No. 1 bundles, Detroit	*$4.50*	46.50	50.50	56.50
Low phos., Youngstown	*$4.50*	55.50	58.50	66.50
No. 1 mach'y cast, Pittsburgh	*58.50*	59.50	58.50	60.50
No. 1 mach'y cast, Philadel'a	56.50	56.50	56.50	58.00
No. 1 mach'y cast, Chicago	*$9.50*	50.50	53.50	59.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$48.50*	$50.17	$53.50	$58.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	*27.00*	28.50	28.50	40.00
Copper, Lake, Conn.	*27.00*	28.50	28.50	40.00
Tin, Straits, N. Y.	93.00†	93.00	94.375	101.25
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	13.80	13.80	13.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers see Key on p. 186→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R3*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	
Buffalo *W6*	66.00	66.50	67.00	67.50	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	66.00	66.50	66.50	67.00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	66.50	67.00	67.50		
Fontana *K1*	75.00	75.50			
Geneva, Utah *C7*	66.00	66.50			
Granite City *G2*	67.90	68.40	68.90		
Hubbard *Y1*			66.50		
Ironton, Utah *C7*	66.00	66.50			
Midland *C11*	66.00				
Minnequa *C6*	68.00	68.50	69.00		
Monessen *P6*	66.00				
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66.50	67.00	67.50	
Sharpsville *S3*	66.00	66.50	66.50	67.00	
So. Chicago *R3*	66.00	66.50	66.50		
So. Chicago *W8*	66.00		66.50	67.00	
Swedeland *A2*	68.00	68.50	69.00	69.50	
Toledo *I4*	66.00	66.50	66.50	67.00	
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*			66.50	67.00	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct); 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos. Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	—	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	—	50.75	76.75	59.75	69.75	40.25	35.00	—	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	—	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	—	40.75	42.00	42.75	45.75	45.50	69.50	52.50	61.50	36.00	32.25	32.75	32.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *J3*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R3*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore *A7* Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R3*; Munhall, Pa., S. Chicago, *U1*.

Lower Prices Reflect Weak Market

Virtually all major consumer areas affected by continuing trend to weakness.

Buyers adopt independent attitude in the face of comfortable inventories.

■ The market shows a continuing trend to weakness. Prices declined in virtually all major consuming areas this week. Lone exception was Chicago, where the market barely held its own.

The mills apparently are in an independent mood, with comfortable inventories and a pretty good idea of how long they can hold out without major purchases. In fact, some buyers are talking about staying out of the market for the balance of the year.

Propaganda Line—Some of this talk, of course, could be for propaganda reasons in the hope that it will smoke out fairly heavy tonnages at lower prices. On the other hand, the steel market situation at the moment is such that the mills know just about how much their operating rates will advance over balance of the year. There's no doubt that the steel market trend is upward, but there are no signs of an overwhelming boom that would force heavy scrap buys in the near future.

Against this backdrop, prices in Pittsburgh declined $2 per ton on heavy melting grades, while in Philadelphia a mill came in for substantial tonnages at $3 under last week's prices. Chicago held steady, but the situation there seemed to be extremely tentative.

Export Slowing—Export demand appears to be slackening, although it's the one outlet holding up prices in New York this week. In Philadelphia, export will continue fairly strong in September, but is expected to slide after that. Birmingham reports overseas demand "dwindling."

The IRON AGE Composite Price dropped to $48.50 this week.

Pittsburgh—Prices of openhearth grades are down $2 as the mills continue to avoid tonnage buys of dealer scrap. The small amount of activity in the district indicates sustained weakness. A local mill bought No. 2 bundles for $42. Railroad heavy melting was down more than $7 from last month. Yards continue to drop their price for turnings.

Chicago—Prices firmed at least temporarily in a number of grades, though not because of any strong gain in sales of scrap to the mills. A "hold order" was canceled by a large mill and reduced shipments began moving again at the quoted prices. Meanwhile, turnings and railroad scrap continued to slide downward.

Philadelphia—One area mill entered the market this week and bought sizable tonnages of No. 1 heavy melting at $48 a ton—a drop of $3 from last week's price. The same mill paid $3.50 under the market for No. 2 bundles. Last week's price of clean cast chemical borings was incorrectly quoted at $43-$44. The correct price: $40-$41.

New York—A general price drop here is due to lack of domestic buying. Only export activity is holding up the price of No. 1 heavy melting. The trade expects further drops if mill orders aren't forthcoming soon.

Detroit—Pessimism is widespread. Local mills are not expected to enter the market for any sizable buys this month. A $2 decline in steelmaking scrap prices this week may be followed by another cut soon.

Cleveland—A Mahoning Valley electric furnace mill bought a fair tonnage for $55 last week, bringing the market down another $1 there and in Cleveland. A local foundry also bought 2-ft foundry steel for $52. Market generally is quiet. Dealers' yards are moderately full because they have been taking in plant scrap but have no home for it. Up to 50,000 tons of turnings are piled up in local yards.

St. Louis—Steady movement of scrap into the St. Louis industrial district was encouraged by stepping up of the steel operating rate to 86.5 pct. The market is steady, with No. 1 bundles and turnings off $1 to $2.

Birmingham — A dwindling export market is sending coastal dealers inland after customers. It makes scrap more plentiful in this district, with a resulting drop in prices. An Atlanta mill bought openhearth grades at $2 below the last prices paid. Specialty grades and cast items show signs of weakening.

Cincinnati—Market is lower but still relatively healthy. Both area mills are taking tonnage this month. Prices are off $1 to $2 and may weaken further due to pressure from other areas. Cast grades are down $1 in a slow market.

Buffalo—Prices dropped $1 for No. 1 steel and $2 for No. 2 grades on the basis of recent sales. All railroad grades fell $2, while shoveling turnings dipped $1.50.

Boston—Steelmaking grades dropped $2.50 in a very weak market. Domestic ordering is practically non-existent and what little export there is will soon be cleaned up.

West Coast—Prices are soft in all markets despite the $3 drop at the first of the month. Exporting is almost dead at the moment.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

SCRAP PRICES *(Effective Sept. 10, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	50.00 to 51.00
No. 1 factory bundles	57.00 to 58.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	50.00 to 51.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and ms. turn.	29.00 to 30.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. punch'gs plate	57.00 to 58.00
Heavy turnings	45.00 to 46.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	69.00 to 70.00
Rails 2 ft and under	73.00 to 74.00
RR steel wheels	68.00 to 69.00
RR spring steel	68.00 to 69.00
RR couplers and knuckles	68.00 to 69.00
No. 1 machinery cast	58.00 to 59.00
Cupola cast	48.00 to 49.00
Heavy breakable cast	46.00 to 47.00

Chicago

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	40.00 to 42.00
No. 1 dealer bundles	48.00 to 49.00
No. 1 factory bundles	54.00 to 55.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate	54.00 to 55.00
Low phos. 3 ft and under	53.00 to 54.00
No. 1 RR hvy. melting	53.00 to 54.00
Scrap rails, random lgth.	61.00 to 62.00
Rerolling rails	68.00 to 70.00
Rails 2 ft and under	67.00 to 68.00
Locomotive tires cut	58.00 to 59.00
Cut bolsters & side frames	59.00 to 60.00
Angles and splice bars	62.00 to 63.00
RR steel car axles	71.00 to 72.00
RR couplers and knuckles	58.00 to 59.00
No. 1 machinery cast	49.00 to 50.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	42.00 to 43.00
Cast iron brake shoe	44.00 to 45.00
Cast iron wheels	51.00 to 52.00
Malleable	58.00 to 59.00
Stove plate	42.00 to 43.00
Steel car wheels	58.00 to 59.00

Philadelphia Area

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	32.00 to 33.00
Mixed bor. short turn.	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	36.00 to 37.00
Clean cast. chem. borings	40.00 to 41.00
Low phos. 5 ft and under	56.00 to 57.00
Low phos. 2 ft and under	57.00 to 58.00
Low phos. punch'gs	57.00 to 58.00
Elec. furnace bundles	54.00 to 55.00
Heavy turnings	46.00 to 47.00
RR steel wheels	65.00 to 66.00
RR spring steel	65.00 to 66.00
Rails 18 in. and under	71.00 to 72.00
Cupola cast	46.00 to 47.00
Heavy breakable cast	52.00 to 53.00
Cast iron car wheels	57.00 to 58.00
Malleable	61.00 to 62.00
Unstripped motor blocks	41.00 to 42.00
No. 1 machinery cast	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	50.00 to 51.00
No. 1 factory bundles	55.00 to 56.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	50.00 to 51.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Cut struct'r'l & plates, 2 ft & under	55.00 to 56.00
Drop forge flashings	50.00 to 51.00
Low phos. punch'gs, plate	51.00 to 52.00
Foundry steel, 2 ft & under	51.00 to 52.00
No. 1 RR heavy melting	54.00 to 55.00
Rails 2 ft and under	71.00 to 72.00
Rails 18 in. and under	72.00 to 73.00
Railroad grate bars	32.00 to 33.00
Steel axle turnings	30.00 to 31.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast	53.00 to 54.00
Stove plate	47.00 to 48.00
Malleable	59.00 to 60.00

Youngstown

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. plate	54.00 to 55.00

Buffalo

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 busheling	47.00 to 48.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	32.50 to 33.50
Cast iron borings	31.00 to 32.00
Low phos. plate	51.00 to 52.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	67.00 to 68.00
RR steel wheels	54.00 to 55.00
RR spring steel	50.00 to 51.00
RR couplers and knucklers	50.00 to 51.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	47.00 to 48.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$41.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	43.00 to 44.00
Drop forge flashings	42.00 to 43.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. punch'gs plate	45.00 to 46.00
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	42.00 to 43.00
Stove plate	43.00 to 44.00
Automotive cast	52.00 to 53.00

St. Louis

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	28.00 to 29.00
Cast iron borings	30.00 to 31.00
Shoveling turnings	30.00 to 31.00
No. 1 RR heavy melting	54.00 to 55.00
Rails, random lengths	63.00 to 64.00
Rails 18 in. and under	69.00 to 70.00
Locomotive tires uncut	58.00 to 59.00
Angles and splice bars	60.00 to 61.00
Std. steel car axles	64.00 to 65.00
RR specialties	60.00 to 61.00
Cupola cast	48.00 to 49.00
Heavy breakable cast	43.00 to 44.00
Cast iron brake shoes	43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron car wheels	51.00 to 52.00
Rerolling rails	70.00 to 71.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	38.00 to 39.00
Elec. furnace, 3 ft & under	44.00 to 45.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and short turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast	40.00 to 41.00
Mixed cupola cast	33.00 to 34.00
Heavy breakable cast	39.00 to 40.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 dealer bundles	35.00 to 36.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	45.00 to 46.00
Mixed yard cast	40.00 to 41.00
Charging box cast	44.00 to 45.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	38.00 to 39.00

Birmingham

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	36.00 to 37.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	48.00 to 49.00
Elec. furnace, 3 ft & under	46.00 to 47.00
Bar crops and plate	54.00 to 55.00
Structural and plate, 2 ft	53.00 to 54.00
No. 1 RR hvy. melting	52.00 to 53.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	63.00 to 64.00
Angles & splice bars	58.00 to 59.00
Rerolling rails	62.00 to 63.00
No. 1 cupola cast	54.00 to 55.00
Stove plate	54.00 to 55.00
Charging box cast	37.00 to 38.00
Cast iron car wheels	46.00 to 47.00
Unstripped motor blocks	44.00 to 45.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	49.00 to 50.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	26.00 to 27.00
Low phos. 18 in. and under	56.00 to 57.00
Rails, random lengths	63.00 to 64.00
Rails, 18 in. and under	71.00 to 72.00
No. 1 cupola cast	44.00 to 45.00
Hvy. breakable cast	42.00 to 43.00
Drop broken cast	54.00 to 55.00

San Francisco

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	43.00
No. 2 bundles	35.00
Machine shop turn.	32.00
Cast iron borings	30.00 to 32.00
No. 1 RR hvy. melting	44.00
No. 1 cupola cast	53.00 to 55.00

Los Angeles

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	43.00
No. 2 bundles	35.00
Machine shop turn.	$29.00 to 30.00
Shoveling turnings	32.00
Cast iron borings	32.00
Elec. furn. 1 ft and under (foundry)	55.00
No. 1 RR hvy. melting	44.00
No. 1 cupola cast	49.00

Seattle

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	42.00
No. 2 bundles	33.00
No. 1 cupola cast	46.00
Mixed yard cast	46.00

Hamilton, Ont.

No. 1 hvy. melting	$47.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	47.00
No. 2 bundles	36.00
Mixed steel scrap	42.00
Busheling	36.00
Bush., new fact., prep'd	47.00
Bush., new fact., unprep'd	41.00
Machine shop turn.	22.00
Short steel turn.	20.00
Mixed bor. and turn.	24.00
Rails, rerolling	56.00
Cast scrap	52.00

makes your hair curl

In the sixth century B.C., ornate coiffures were already common, and in Rome after Augustus Caesar, women adopted even more elaborate styles. However, it was at the court of Louis XVI that hairdressing reached an unprecedented extravagance, harboring birds, dolls, flowers, vegetables and even model ships in full sail.

After 1873, fashionable women used the heated irons of M. Marcel, and about a half century ago Charles Nessler created the permanent wave—transforming the small handicraft of hairdressing into an industrial enterprise with gross sales that now total more than $1,250,000,000 annually.

Today, some 200,000 beauty and barber shops are important consumers of steel; for hairpins, shears, razors and clippers; for equipment, furniture and fixtures. To meet this and hundreds of other demands for steel, a continuous supply of scrap must be available to the mills.

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NONFERROUS MARKETS

Panicky Note Enters Copper Market

Producers apparently fear that long price slide has not yet run its course.

More protection against imports will be asked. Calumet & Hecla considers shutdown.

■ The copper market has taken on some panicky overtones. Producers apparently fear that the long slide in prices has not yet run its course.

Within the past week, here's what has happened:

1. Beginning the day after Labor Day, producers dropped their prices 1.5¢ per lb, to 27¢.

2. A. J. O'Connor, vice president, Consolidated Coppermines Corp., announced he would appeal to the U. S. Tariff Commission for more protection from imports. The present law imposes a 2¢ per lb duty on imported copper when the domestic price is 24¢ per lb or lower. Mr. O'Connor would like to see this duty imposed at a higher price.

Domestic Mines Costly — Mr. O'Connor indicates his position is supported by Phelps Dodge. The two companies have one thing in common: Their output comes from U. S. mines. It is no secret that working domestic properties is far more expensive than many foreign operations.

J. B. Pullen, assistant general manager of Phelps Dodge, says the cost of Arizona copper operations has increased 500 pct in the last 20 years.

3. Calumet & Hecla, Houghton, Mich., announced it is considering closing down unless it can bring its costs down substantially.

Stabilization Fails—The price drop, third in the last couple of months, appears to mark the end of the producers' attempt for maximum stabilization of the copper price. A representative of one major producer says his company will "stay competitive."

Early on the day that producers lowered prices, custom smelters copper dropped ½¢ per lb to 26.50¢ per lb, and European prices were off. This week, smelters copper dropped again to 25¢ per lb. This could be the forerunner of further producers price weakness.

Aluminum Competition — Some industry observers believe copper producers are keeping a sharper eye on aluminum markets, than on custom smelters and each other. Producers admit that once they lose a market to another metal it is lost forever because of tooling costs. Just before the Labor Day vacation reports began to filter in that aluminum markets were beginning to firm up.

Lead and Zinc

The lead and zinc mining industry is expected to file this week or early next week the expected petition asking the U. S. Tariff Commission for higher duties on imports. Western Congressmen say the mining firms will agree on the final form of the petition during the American Mining Congress meeting, Salt Lake City.

When the petition is filed, congressional sources expect action by the Commission in a month or two. President Eisenhower has promised that he will ask the Commission to "act expeditiously" on the petition. The Chief Executive has indicated he still would prefer to see the problem settled by legislation, but is backing the Commission study because it would be quicker than resubmitting the Administration's sliding scale import tax plan at the next session of Congress.

Magnesium

Here's the situation with regard to the proposed sale of the government's magnesium plant at Velasco, Tex. (IRON AGE, May 9, p. 172), now being operated by Dow Chemical Co.

The Justice Dept. was to have made a ruling in 60 days on whether Dow's high bid could be accepted. The stated period is long since past, and it now appears that Justice is in no hurry to make a decision.

Deadline for a move by General Services Administration is January 1958. At that time Dow's Velasco lease will expire.

The Velasco smelter is currently accounting for about half of all domestic magnesium output.

Tin prices for the week: Sept. 4—93.00; Sept. 5—93.00; Sept. 6—93.00; Sept. 9—93.125; Sept. 10—93.125.*

* Estimate.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	28.10	27.10	8/1/57
Aluminum pig	26.00	25.00	8/1/57
Copper (E)	27.00	28.50	9 3 57
Copper (CS)	25.00	27.00	9 9 57
Copper (L)	27.00	28.50	9 3/57
Lead, St. L.	13.80	14.80	8/11/57
Lead, N. Y.	14.00	15.00	8/11/57
Magnesium ingot	38.80	34.00	8/13/56
Magnesium pig	38.25	33.75	8/13/56
Nickel	74.00	84.50	12/6/56
Titanium sponge	165-225	200-250	5/8/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 182.

MACHINING PERFECTION always starts with the right steel

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"Machines window pivot pins 35% faster with J & L C-1117 leaded steel"

Conversion to J&L "C-1117" leaded steel from regular "C-1117" steel cut total machining time 35% for this pivot pin used in linkage for turning quarter windows. Cycle time was cut from 3.5 to 2.6 seconds for this part machined from 3/8" cold finished round. J&L leaded steels give you higher cutting speeds, longer tool life, improved finish. Call your local distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

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NONFERROUS PRICES *(Effective Sept. 10, 1957)*

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	46.6	44.3	43.6	42.7
5052	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-65.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size*	¼	⅝-⅝	¾-1	1¼-1½
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.420	$1.893	$2.367	$2.839
.024 gage	1.774	2.366	2 957	3.549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	49.13	.....	46.36	49.32
Brass, 70/30	43.02	43.56	44.26	45.93
Brass, Low	45.50	46.04	45.44	48.31
Brass, R L	46.37	46.91	46.31	49.18
Brass, Naval	47.27	.....	41.58	50.68
Munts Metal	45.39	.....	41.20	.....
Comm. Bs.	47.78	48.32	47.72	50.34
Mang. Bs.	51.01	.....	45.11	.....
Phos. Bs. 5%	68.07	.....	68.57	.....

Free Cutting Brass Rod 31.30

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-88.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy, $10.00; Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be.$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.70
Calcium, 99.9%, small lots .....$ 4.55
Chromium, 99.8% metallic basis....$ 1.31
Cobalt, 97-99% (per lb)....$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined 39.50-53.50
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9%, dollars per troy oz..$ 2.25
Iridium, dollars per troy oz...$86 to $89
Lithium, 98% .....$11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$250 to $252
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz...$23 to $24
Platinum, dollars per troy oz. ..$82 to $87
Rhodium .....$120.00 to $125.00
Silver ingots (¢ per troy oz.) 90.625
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium .....$ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 26.25
No. 120 ..... 25.25
No. 123 ..... 23.75
80-10-10 ingot
No. 305 ..... 30.25
No. 315 ..... 28.25
88-10-2 ingot
No. 210 ..... 37.75
No. 215 ..... 33.50
No. 245 ..... 29.75
Yellow ingot
No. 405 ..... 21.50
Manganese bronze
No. 421 ..... 24.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.75-26.50
0.60 copper max. 25.50-26.00
Piston alloys (No. 122 type)..23.25-25.00
No. 12 alum. (No. 2 grade)....22.25-23.00
108 alloy 22.75-23.50
195 alloy 25.25-26.75
13 alloy (0.60 copper max.)...25.50-26.00
AXS-679 .....22.75-23.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 24.00-25.00
Grade 2—92-95% 22.25-23.00
Grade 3—90-92% 21.25-22.00
Grade 4—85-90% 19.75-21.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	23	22¾
Yellow brass	17⅜	15⅜
Red brass	20¾	19½
Comm. bronze	21	20¼
Mang. bronze	16⅛	15⅜
Yellow brass rod ends	17⅛	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	20
No. 2 copper wire	18½
Light copper	16½
*Refinery brass	18
Copper bearing material	17

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	20
No. 2 copper wire	18½
Light copper	16¼
No. 1 composition	19
No. 1 comp. turnings	18½
Hvy. yellow brass solids	13½
Brass pipe	17
Radiators	14½

Aluminum

Mixed old cast	14 —14½
Mixed new clips	16½—17
Mixed turnings, dry	14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	17½—18
No. 2 copper wire	15½—16
Light copper	14 —14½
Auto radiators (unsweated)	12¾—12½
No. 1 composition	16 —16½
No. 1 composition turnings	15½—16
Cocks and faucets	12½—13
Clean heavy yellow brass	11½—12
Brass pipe	13 —13½
New soft brass clippings	13½—14
No. 1 brass rod turnings	11¾—12¼

Aluminum

Alum. pistons and struts	5½— 6
Aluminum crankcases	11 —11½
1100 (2S) aluminum clippings	14 —14½
Old sheet and utensils	11 —11½
Borings and turnings	7 — 7½
Industrial castings	11 —11½
2024 (24S) Clippings	12½—13

Zinc

New zinc clippings	4 — 4½
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1½— 1¾

Nickel and Monel

Pure nickel clippings	70-75
Clean nickel turnings	55-60
Nickel anodes	70-75
Nickel rod ends	70-75
New Monel clippings	42-45
Clean Monel turnings	30-35
Old sheet Monel	40-42
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	9½—10
Battery plates (dry)	4¼— 4½
Batteries, acid free	2¾— 3

Miscellaneous

Block tin	75 —76
No. 1 pewter	59 —60
Auto babbitt	39 —40
Mixed common babbitt	11 —11½
Solder joints	15½—16
Siphon tops	42
Small foundry type	13 —13¼
Monotype	13 —13¼
Lino. and stereotype	12 —12¼
Electrotype	11 —11¼
Hand picked type shells	8 — 8½
Lino. and stereo. dross	3¾— 4
Electro. dross	3 — 3¼

STEEL PRICES

(Effective Sept. 10, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot rolled	Cold rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot rolled	Alloy Cold rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				15.05 *T8*
	Phoenixville, Pa.					5.50 *P2*		5.50 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.	$80.50 *N8*	$101.00 *N8*	$114.00 *N8*						7.60 *W1*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$96.00 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.40 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1* 6.525 *W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.50 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R3*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *G3, D2*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*		10.40 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.525 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.50 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling Follansbee, W. Va.					5.275 *W3*			4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*		5.425 *Y1*	7.75 *Y1*			7.15 *Y1, J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.825 *K1*	9.00 *K1*				
	Geneva, Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			5.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R3,C16*	7.75 *T2*		4.925 *T2, R3,C16* 5.225 *C10*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

IRON AGE

STEEL PRICES

(Effective Sept. 10, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot rolled *18* ga. & hvyr.	Cold rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*			6.15 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*		6.25 *B3*	$10.15 *B3*	$5.85 *B3*	
	Worcester, Mass.										6.45 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.35 *L1*			
	Ashland, Ky.	4.925 *A7*		6.60 *A7*	6.625 *A7*									
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*										
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*				6.15 *A5, R3 W8, N4, K2*			
	Sterling, Ill.										6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*			6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G2*	9.075 *G3*						
	Newport, Ky.	4.925 *A1*	6.05 *A1*											
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*			6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*							6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*								
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1, R3*	7.275 *R3*	8.975 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*		6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*								6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*				$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*			6.15 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.30 *K1*				8.175 *K1*	10.275 *K1*				$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*												
	Kansas City, Mo.										6.40 *S2*			
	Los Angeles, Torrance, Cal.										6.95 *B2*			
	Minnequa, Colo.										6.40 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*							6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*							6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.40 *S2*			

STEEL PRICES

(Effective Sept. 10, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B2*	7.625 *B2*	7.65 *W6*
	Claymont, Del.							5.70 *P2*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.50 *L4*		7.20 *L4*	7.925 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.	5.650 *N8*	5.650 *N8*	7.65 *N8* 7.85 *W10* 7.80 *J3*	6.550 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.950 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland, Newport, Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8, B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8, L2,N9,B5*	7.925 *U1* 6.675 *W8*	5.10 *U1, A1, W8,13*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1* 7.40 *W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13*		8.775 *A5, C13*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.55 *P3* 7.50 *P8,B5*	6.475 *R3* 6.575 *G3*	8.775 *R3* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind.											7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Pittsburgh, Midland, Donora Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3 C11, W10,S9,C8*	6.475 *U1,J3, C11*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3*	7.625 *U1,J3*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.65 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle, Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.85 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16, S11*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.45 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

† Merchant Quality—Special Quality 35¢ higher.

STEEL PRICES *(Effective Sept. 10, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co. Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co. Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co. Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co. Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon,
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+0.50								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.75	+16.0	2.25	+13.50	7.25	+8.50

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium . . .83 D-3, D-5
Oil hardened manganese . .45 O-2
Special carbon 41 W-1
Extra carbon 345 W-1
Regular carbon 29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Stainless Type	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
	302				37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	
	410	29.55	33.10	36.70	
	430	29.80	33.55	37.25	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Hermetic		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 80	19.20
Trans. 52	17.10	Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N8*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50¢ Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢ lb.	Merch. Wire Galv ¢ lb.
Alabama City *R3*	173	187		212	193	8.65	9.20
Aliquippa *J3***	173	190			190	8.65	9.325
Atlanta *A8***	175			208	199	8.50	9.10
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*						8.65	8.95*
Chicago *N4****							
Cleveland *A6*							
Cleveland *A5*						8.65	
Crawf'dsv. *M4****	175	192		214	198	8.75	9.425
Donora, Pa. *A5*	173	187		212	193	8.65	9.20
Duluth *A5*	173	187		212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193	8.65	9.20
Galveston *D4*	8.95‡						
Houston *S2*	178	192		217	198	8.90	9.45
Jacksonville *M4*	184 ‡	197		219	203	9.00	9.675
Johnstown *B3****	173	190**	172		196**	8.65	9.325**
Joliet, Ill. *A5*	173	187		212	193	8.65	9.20
Kokomo *C9**	175	189*		214	195*	8.75	9.30*
L. Angeles *B2****						9.60	10.275
Kansas City *S2**	178	192*		217	198*	8.90	9.45*
Minnequa *C6†*	178	192†	177	217	198†	8.90	9.45†
Monessen *P6*					193	8.65	9.20
Palmer, Mass. *W6*						8.95	9.50*
Pittsburg, Cal *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A5*	173	187			193	8.65	9.20
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6†*				236		9.60	10.15†
SparrowsPt. *B3***	175			214	198	8.75	9.425
Struthers, O. *Y1**						8.65	9.30
Worcester *A5*	179					8.95	9.50
Williamsport *S5*							

* Zinc less than .10¢.
** 11-12¢ zinc.
*** .10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26 0.40	0.41 0.60	0.61 0.80	0.81 1.05	1.06 1.35
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*					
Buston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles	11.15	12.60	14.80	17.80	
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton *R4*		10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.75
Warren, Ohio *T4*					
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.
Babcock & Wicox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	
	2½	12	48.94	57.31	
	3	12	56.51	66.18	
	3½	11	65.97	77.25	
	4	10	87.61	102.59	

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets Hot-Rolled (18 ga. & hvr.)	Sheets Cold-Rolled (15 gage)	Sheets Galvanized (10 gage††)	Strip Hot-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled (merchant)	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68				
Baltimore	$.10	8.38	8.88	9.86	8.86	8.76	9.29	9.16	9.73	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57				
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.53		15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.60	11.22	8.65	9.05	8.65	8.95	8.85	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.65	19.35	18.40
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	9.20	15.89	14.74	19.44	18.54
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65				17.60
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		8.45	9.75		8.60	9.05	9.10	9.05	11.10	16.20		19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	9.22	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.60	10.85	11.75	9.65	9.65	9.70	9.80	12.85	17.25	15.00	21.05	19.25
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25	9.85				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.42	9.53	9.45	9.67		15.02	15.19	18.42	18.99
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70				
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	9.41	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	9.20	15.80	14.80	19.35	18.60
Portland		9.50	11.20	11.55	11.35	8.30‡	9.65	9.65	11.65	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	11.05	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.10	14.05	16.55	15.85	20.65	19.45
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.25	21.55	21.05
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.01	19.01	18.81
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other or with galvanized sheets for quantity.
†† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to ½ in.

(Effective Sept. 10, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975				14.75
Cleveland *R3*				9.75			
So. Chicago *R3*							
Ensley *T2*	5.525	6.50					
Fairfield *T2*		6.50		9.75		6.60	
Gary *U1*	5.525					6.60	
Huntington *C16*		6.50					
Ind. Harbor *I3*	5.525		6.975	9.75		6.60	
Ind. Harbor *Y1*				9.75			
Johnstown *B3*		6.50					
Joliet *U1*			6.975				
Kansas City *S2*				9.75			14.75
Lackawanna *B3*	5.525	6.50	6.975			6.60	
Lebanon *B3*			6.975		14.50		14.75
Minnequa *C6*	5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh *P5*							14.75
Pittsburgh *J3*				9.75			15.25
Seattle *B2*				10.25		6.75	
Steelton *B3*	5.525		6.975			6.60	
Struthers *Y1*				9.75			
Torrance *C7*						6.75	
Williamsport *S5*		6.50					
Youngstown *R3*				9.75			

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b. oven)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	9	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	45.75
Electrodeposited	37.00
Brass, 80-20, ball anodes, 2000 lb or more	48.00
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	102.25
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical $1.07 per in.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	74.80
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum N. Y.	48.80
Chromic acid, flake type, 100,000 lb or more	31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Pct. Discounts: Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in and smaller	63

Rivets	Base per 100 lb
½ in. and larger	$12.25
	Pct. Off List
7/16 in. and smaller	19

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat	
New std. hex head, packaged	
⅝" diam. and smaller x 6" and shorter	40 — 26
¾", ⅞", and 1" diam. x 6" and shorter	22 — 3
⅝" diam. and smaller x longer than 6"	8 — +13
¾", ⅞", and 1" diam. x longer than 6"	+ 6 — +32

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	25,000-200,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In Cartons		16	19
In Bulk			
⅝" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955 value, class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	$1.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	$8.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅝ to ⅛-in grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	16.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.90
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.4¢ to 41.5¢
Copper electrolytic	45.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	$5.00
Lead	8.50¢ plus metal value
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	$1.02
Stainless steel, 316	$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) $3.75 (nominal)	
Zinc, 10 ton lots	18.5¢ to 31.7¢

FERROALLOY PRICES

(Effective Sept. 10, 1957)

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.50	0.20% C....	38.50
0.03% C....	41.00	0.50% C....	38.25
0.06% C....	39.50	1.00% C....	37.50
0.10% C....	39.00	1.50% C....	37.35
0.15% C....	38.75	2.00% C....	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 26.50
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si.... 35.50
8.50% max. C, 50-55% Cr, 3-6% Si.. 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.31
0.50% max. C 1.31
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.29
Ton lots 1.31
Less ton lots 1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads 44.65
Ton lots 48.95
Less ton lots 51.45

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 25.65
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 24.25
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20 % Fe ½ in. x 12 mesh.

Ton lots 20.15
Less ton lots 21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 17.20
Ton lots 18.70
Less ton lots 19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed 18.50
Ton lots to carload packed 19.65
Less ton lots 20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 14.80
Ton lots packed 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads 34.00
Ton lots 36.00
250 to 1999 lb..... 38.00
Premium for Hydrogen-removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk 12.80
Ton lots, packed 14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet 15.10
Ton lots, packed, pallets 16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	22.20	20.90
98% Si, 0.75% Fe	22.95	21.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 7.70
Ton lots, packed 10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.00	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth 3.20
Crucible 3.30
High speed steel (Primos) 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.20	4.55

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ..... 10.65¢
Ton lots ..... 11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots $4.90
Less ton lots 4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5, per pound contained V_2O_5 .... $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortam, f.o.b. Niagara Falls, Ton lots per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% ma. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% ma. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.15

RAILWAY EQUIPMENT

FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

SERVICE TESTED

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline
Diesel-Electric

SPECIAL

STANDARD GAUGE CARS

SIDE DUMP CARS

10—Air-operated, 30-Cubic Yard, Drop Door
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14—40-Ton Capacity

COVERED HOPPER CARS

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RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000- Gallon
Cleaned and Tested

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Overhead and Locomotive

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Phone: Mitchell 6-1212

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50-B Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"

Chicago Prepares For Busy Fall

Used machinery dealers there are out shopping to build up inventories already strong.

Some have already experienced a gain in the number of both inquiries and sales.

▪ After a fairly strong summer, Midwestern used machine dealers are reporting an upswing in inquiries. At the moment, one of the weaker areas of the market, toolroom equipment, seems to be most strongly affected by this potential upswing.

A spurt of inquiries for toolroom equipment became apparent in the first two weeks of August. A seasonal slowdown had been expected at that point, chiefly because of the increasing number of plants in the area which shut down entirely in early August. At the moment, the wave of inquiries has developed into solid sales. There is no strong gain, but it's apparent that toolroom equipment is moving off sales floors more rapidly than had been the case earlier this year.

Fabricators Active—Until August, strongest market activity was in heavier production equipment, sheet metal fabricating equipment, and in rebuilt machines. Rebuilt units were popular because customers, caught with a short capital balance, wanted machines virtually custom built without spending heavily for brand new equipment.

Since July, sheet metal fabricating equipment has been moving at a slightly slower pace than its strong movement of last spring. It is still selling well, however, and with the added interest being shown in toolroom equipment, the general movement of used tool volume, both in dollars and in units, is upward.

Rebuilding Popular—Rebuilders have already shown a considerable gain. Shops report their backlogs have advanced to 6-8 weeks. Though a substantial bite of this new business is in heavy repair work of customer-owned machines, the fact remains that there is new business in the shops and every indication there's more on the way.

Inventories Strong — Dealers' stocks of fabricating equipment are generally down, their toolroom equipment is up. In most cases, dealers have come out of the summer period in the strongest inventory position they've had in some time. Much of it is in equipment that, potentially, has a strong fall sales outlook. With price boosts in the offing, it appears that fourth quarter profit will improve—and probably at a better rate than sales. The sales outlook is not weak, but the fall pickup is now expected to come a little more slowly than had previously been expected.

Profits Up?—With an improved inventory position, it suggests that dealers will see more inventory turnover, more dollars per unit, and consequently a better profit picture at year's end than was the case through first half.

Thus far, nobody is blowing horns about second half sales. But the dealers are out shopping, and they're seeking to beef up their inventories, which are already in an improved condition.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10" Ga. Bertsch Initial Type
10' x ½" Kling Pyramid Type—LATE
16' x ⅜" Ransome, Pyramid Type
18' x 1" Nyles Pyramid Type
20' x 1" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ⅜" Dreis & Krump No. 228

BRAKES—PRESS TYPE
12' x ½" Cincinnati

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span 230/3/60
5 ton Whiting	48' Span 220-3-60 A.C.
5 ton Shepard Niles	53' Span 220-3-60
5 ton Cleveland	60' Span 115 Volt D.C.
8 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	38' Span 440/3/60
10 ton Shaw	120' Span 230 Volt D.C.
15 ton Shepard Niles	52' Span 230 Volt D.C.
15 ton Shepard Niles	55' Span 220/440 A.C.
15 ton Niles	75' Span 220-3-60
20 ton P&H	57' Span 220/440 A.C.

CUT OFF MACHINE
#2A Modern Automatic Cut Off Machine, For Pipe, Tubing, Bars to 2" O.D.

FORGING MACHINES
1" to 5" Acme Ajax, National

LEVELLERS—ROLLER
48" Aetna 17 Rolls 3¾ dia.
66" Aetna 17 Rolls 4¾" dia.

PLANER—PLATE EDGE
35' Southwark, 16 Pneu. Jacks, Capy. 1½"

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING

800, 1600 lb. Chambersburg J-2	Board Drop
1200, 1500 lb. Chambersburg	Board Drop
2000 lb. Erie Type FV	Board Drop
2000 lb. Chambersburg Model E	Steam Drop
2000, 25000 lb. Erie	Steam Drop
3000 lb. Niles-Bement-Pond	Steam Drop
4000 lb. Chambersburg	Steam Drop
1100 lb. Erie Single Frame	Steam Forging
1500 lb. Chambersburg Sgle Fr	Steam Forging
20,000 lb. Massey Arch Frame	Steam Forging
48" x 48" Chambersburg	Ceco Stamp

PRESSES—HYDRAULIC
500 ton HPM Fastraverse, Bed 36"x36"
1500 ton Bliss, 15" Stroke, Bed 49"x48"
1500 ton Mesta Steam Hydr. Forging Press
2000 ton Bliss 18" Stroke Bed Area 54"x55"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—STRAIGHT SIDE
100 ton Clearing F1100, 14" Str. Bed 36x36"
180 ton Hamilton #847, 12" Str. 85½" Bet. Ups.
200 ton Clearing F1200-42, Stroke 30", Bed 44"x38"
250 ton Bliss #88 12" Str. Bed 29"x29"
250 ton Bliss #81 7½" Str. Bistr 33"x39"

PUNCH—BEAM
W&W #11 Beam Punch, Capacity Beams 12"-30"

PUNCH & SHEAR COMBINATIONS
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker

ROLLING MILLS
6' x 5" Torrington Wire Flattening Mill Line
8" x 10 Schmitz Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 30" Farrel Two Stand Two High
20" x 36" Single Stand Two High
26" x 72" Cold Rolling Mill

ROLLS—PLATE STRAIGHTENING
72" Niles, 7 Rolls 9" Dia. Motor Driven

SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"

SHEAR—GATE
12' x ⅜" Niagara Model 1212. NEW 1951

SHEAR LINES
36" Halden Shear Line Leveler, Classifier, etc.
60" Shear Line, With Leveler & Tables
96" x 14 Ga. Cleveland. With Playoff Leveler, Elect

SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
8' x ¼" Niagara—NEW 1952
10' x ¼" Cincinnati #1810
10' x ⅜" Cincinnati #2510

SHEARS—ANGLE
6 x 6 x ¾ Hilles & Jones
4 x 4 x ⅝" Long & Allstatter

SLITTERS
24" Yoder Slitting Line
36" Paxon Slitting Line
42" Illinois, 4½" Shaft Dia.

STRAIGHTENERS
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
Kane & Roach Roll Straightener & Cut-off Capacities 7/16" to ⅞" Hex. Bars

SWAGING MACHINES
#4 Fenn, Capacity 2¾" Tubing, LATE
#6½A Fenn, Capacity 2¼" Tube 3⅜" Solid 10" Die Length Hydraulic Feed, LATE

WIRE MACHINERY
#2 Vaughn 12-Die Continuous Wire Drawing Machine. Capacity 14 to 27 B&S Ga.
4—Block Vaughn Wire Drawing Machine 22" Diameter Blocks

• Manufacturing

A. T. HENRY & COMPANY, INC.

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• Equipment

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Surplus Mfg. Equipment Inventories Purchased

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	1100	F.M.	OVZK, B.B.	4800	1800
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2200	600
1	500	Whse.	CW	550	350
1	400	Whse.	CW	440	514
1	350	Cr.Wh.	Size 71	208/416	1765
1	350	G.E.	1M-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	Cr.Wh.	Size 290	2300	350
1	250	Al.Ch.		550	600
1	200	G.E.	IE13 B-M	220/440	1760
1	200	G.E.	MT-557Y	220/440	1760
1	200	Cr.Wh.	20QB	440	505
1	200	G.E.	1M	440	435
3	200	G.E.	I-17AM	2200	457
1	200	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2300	455
1	125	A.C.		440	865
1	125	Al.Ch.		440	720
1	100	G.E.	1M-10	2200	435
1	100	G.E.	1M	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
1	650	G.E.	FT-559BY	440	3570
3	500	Whse.	CS-1216	2000	500
2	450	Whse.	CS-1420	2300/4150	854
1	400	G.E.	IK	2200	500
1	300	G.E.	KT-559A	2300	1775
1	200	G.E.	IK-17	440	580
2	200	G.E.	KT-557	440	1500
1	150/75	G.E.	IK	440/900	870
1	150	Whse.	CS8568	440	880
1	150	Whse.	CS	440	580

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501SL1000	6900/13800	514
1	2850	Whse.	Sp.f	2300/4600	514
1	2800	Whse.	Sp.f	2300	720
1	2000	Whse.		2300	102
1	1750	G.E.	ATI	2200	5600
1	735	G.E.	ATI	2200/13800	600
1	450	Whse.		2200	1215
1	225	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800
1	100	G.E.	TS-7556	220/440	900

BELYEA COMPANY, Inc.
47 Howell Street, Jersey City 6, N. J.

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT
SLIP RING MOTORS
Constant Duty—3 phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	2500	Whse.	CW	4600/2300	720
1	2500	G.E.	Mill	2300	240
1	1800	Whse.	Mill	6600/4000	270
2	1800	Whse.	Mill	2200	252
2	500	Al. Ch.	ARY	2300	505
1	500	G.E.	I-M	2300	450
1	400	Al. Ch.	ARY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	I-M-15B	2200	1180
1	350	G.E.	MT-412	2200	450
1	300	Whse.	CW-1012	2200	720
1	250	Al. Ch.	ARY	440	705
1	250	G.E.	MT-414	2200	300
1	200	G.E.	I-M	2200	1760
2	200	G.E.	I-17-M	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ARY	440/220	720
1	150	Whse.	CW	4160/2300	585
1	150	Whse.	CW-1000	440	435
1	100	Whse.	CW	440/220	1160
1	100	El. Dy.	ED1X612	2300	900
2	100	G.E.	MT-562	440-220	570
2	100	G.E.	I-15A-M	2300	495
1	100	Al. Ch.	ARY	440	430

SYNCHRONOUS MOTORS
3 Phase, 60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	1750	G.E.	100	2200	3600
1	1500	G.E.	80	2400/4160	900
1	1500	Whse.	80	2300	514
1	920	G.E.	80	2200/440	300
1	710	G.E.	80	2300	720
1	450	Whse.	100	2200	128.5
3	350	G.E.	100	2300	900
1	300	G.E.	100	2300	720
1	300	G.E.	80	2200	600
2	300	G.E.	80	440	400
2	250	Whse.	80	440	660
1	200	Al. Ch.	100	2200	514
1	200	Al. Ch.	100	2300	400
1	150	G.E.	100	2200	900
1	150	El. Mchy.	80	220	720
1	150	G.E.	100	550	600
3	125	G.E.	80	4000/2200	1200
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
1	100	Ideal	80	440/220	900
2	100	G.E.	80	440/220	600
1	100	El. Mchy.	100	440/220	360
2	50	G.E.	80	2200	600

T. B. MAC CABE COMPANY
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HIGH GRADE TOOLS

7½" National high duty air clutch forging and upsetter
4" National high duty upsetting and forging machine, late (2)
3"-3½" Ajax upsetting and forging machine, steel frame
3" National high duty upsetter, air clutch
3" Ajax upsetter, air clutch
1½" National upsetting and forging machine, hardened ways (2)
Economy Type R automatic threading or pointing machines, 1948 (2)
10½" x 10½" No. 3 Motch & Merryweather cold saw, late, MD
10" x 10" Racine hydraulic Shear-Cut metal saw
750 ton No. 3 National Maxipress, air clutch, new 1945
60 ton No. 600 B Perkins OBI press, new 1958
800 ton Model 2E48-800 Hamilton straight side single crank, air clutch
250 ton Williams White & Co. four post upward working hydraulic press
150 ton HPM Hydro-Power Fastraverse hydraulic press
350 ton No. 18T Cleveland single crank double action toggle drawing press
260 ton No. 795½-72 Toledo double crank toggle drawing press
200 ton 7-72" Bliss double crank straight side tie-rod frame press
126 ton Model 60-D-66 Cleveland straight side double crank tierod frame single geared press
600 ton No. 664 Toledo tierod frame knuckle joint coining press
400 ton No. EG 54 Ferracute upward working coining press
30" x 30" x 8' Cincinnati Hypro 2 rail, one right hand side head, dial feed planer
Economy type KK automatic bolt head shaving and pointing machine

Ask for your list No. 206.

MILES MACHINERY CO.
PHONE SAGINAW PL 2-3105
2041 E. GENESEE AVE. SAGINAW, MICH.

Eastman 14" Comp. & gear analy. B & S No. 13 Gear Cutter.
Gleason 3" Str. Bevel Gear Gen. Besley No. 372 Disc. Grinder, 1947.

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800 TON MILES WHEEL PRESSES
(2) Late Type 800 ton Wheel Presses, 96" between bars; max. dist. ram and resistance head 9'3" wgt. each 65,000 lbs.
(1) 32" Ohio Dreadnaught Shaper, M. D.

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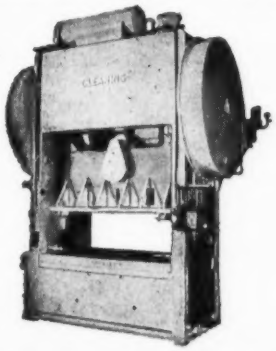

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TRABON

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it processes automobile parts 24 ways—and relies on Trabon

Trabon on mammoth transfer machine lubricates 3,504 separate operations per hour

Sixty feet and 26-stations long is this new Snyder transfer machine. It mills, threads, drills, reams — in fact, performs 24 separate operations in processing steering knuckles for an automobile manufacturer To lubricate this automated giant by hand would be an impossible job. That's why the manufacturer of this transfer machine had Trabon Automatic Centralized Lubricating Systems installed.

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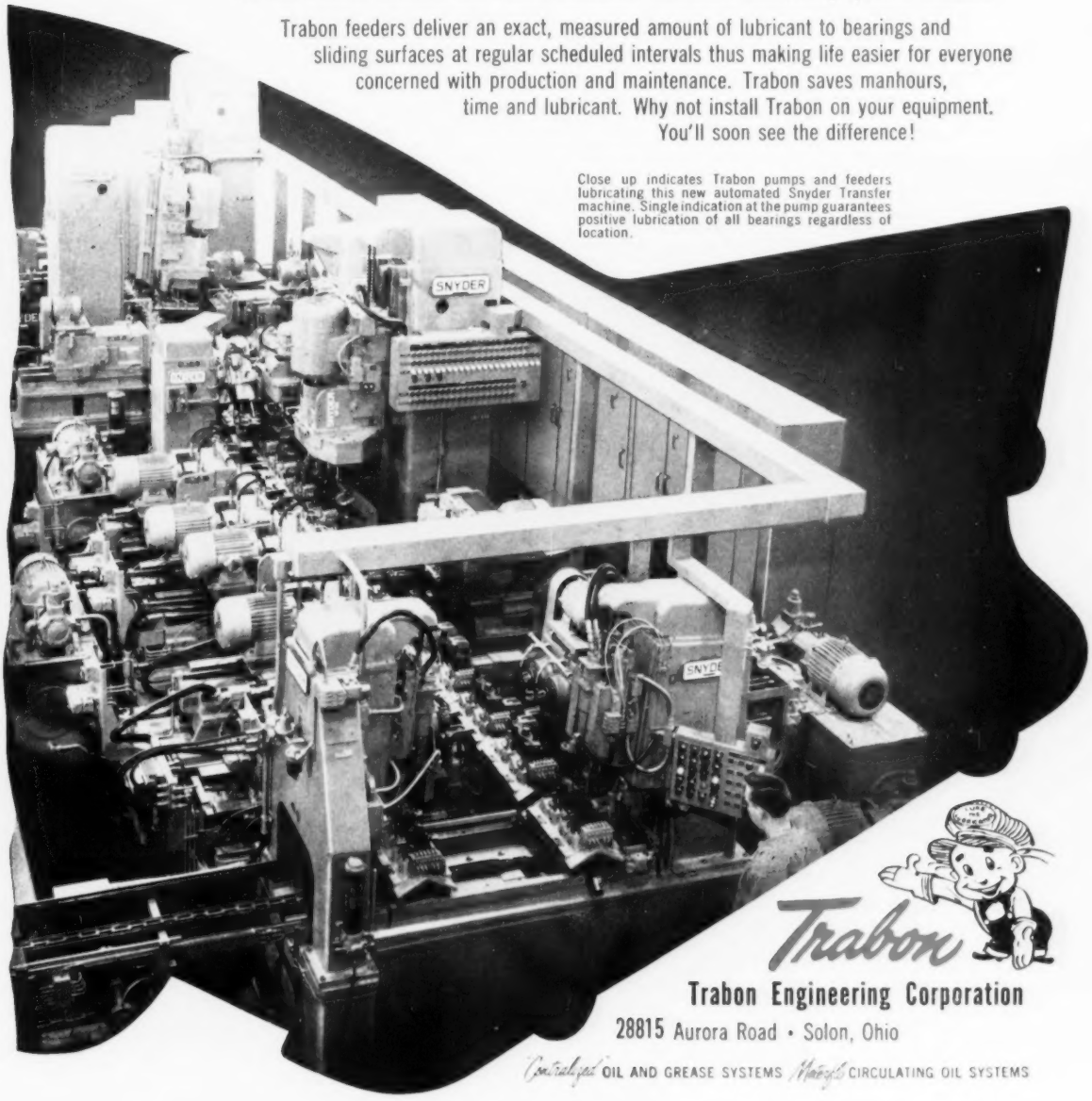

Close up indicates Trabon pumps and feeders lubricating this new automated Snyder Transfer machine. Single indication at the pump guarantees positive lubrication of all bearings regardless of location.

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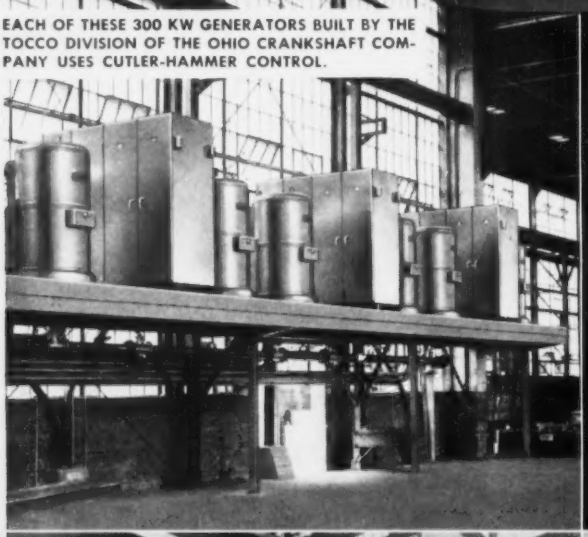

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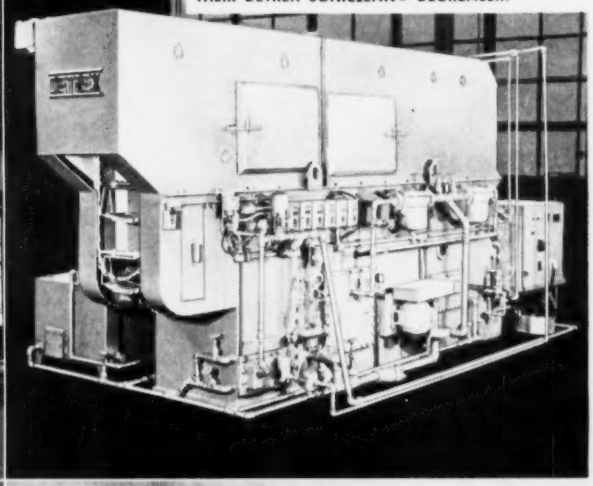

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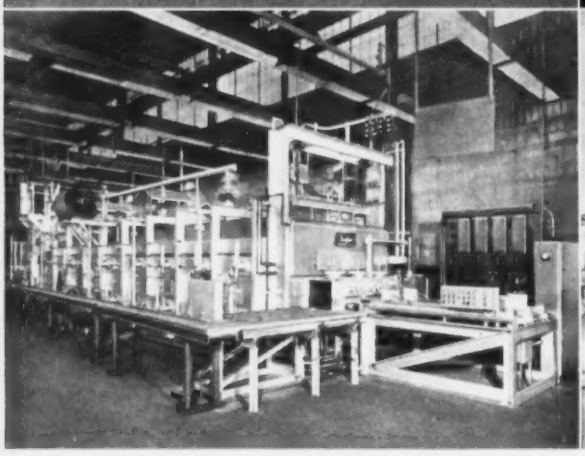
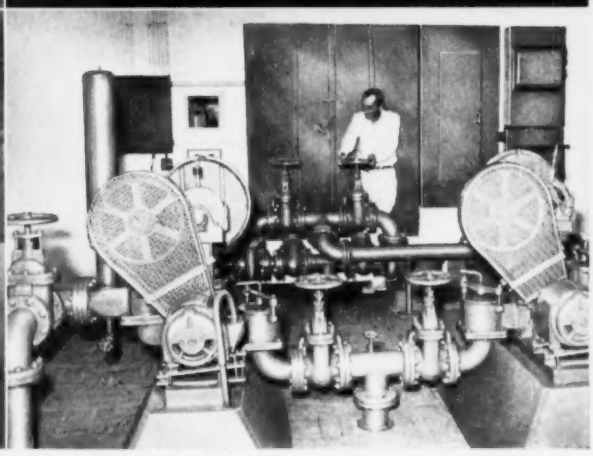


THE FULLY AUTOMATIC PUSHER TYPE CARBURIZING HEAT TREATMENT FURNACE MANUFACTURED BY THE SPECIAL FURNACE DIVISION OF THE SURFACE COMBUSTION CORP. IS EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS.



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